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PERLAN MISSION
TARGETS 90,000FT
ABOVE THE ANDES
FEATURE P24

SHOW PATROL

Maritime surveillance gap prompts Tokyo to commit Kawasaki P-1s for debut appearance at RIAT 15

RUNWAY WAIT

Heathrow secures prime slot after UK capacity study, but final decision remains up in the air 20

FLIGHT

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COVER IMAGE

Our preview of the EAA AirVenture get-together in Oshkosh takes a look at Textron Aviation's range of products – including the iconic Cessna 172 **P32**



BEHIND THE HEADLINES

Dominic Perry braved soaring temperatures in Donauwörth, Germany to visit **Airbus Helicopters**, which unveiled a new technology demonstrator called **Bluecopter** that is targeting dramatic cuts in noise and emissions for future rotorcraft (**P8**)



NEXT WEEK TRAINING

We get airborne in the RAF's Hawk T2, and look at the next key milestones for the UK Military Flying Training System

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Russian Helicopters, Dassault



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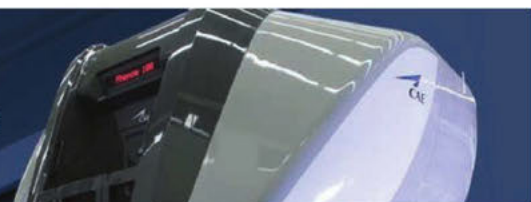




IMAGE OF THE WEEK

Vietnam Airlines' first Boeing 787 Dreamliner is pictured flying past the Washington Monument in the US capital on 6 July, ahead of its planned delivery at the end of the month. Flightglobal's Ascend Fleets database shows the Hanoi-based national carrier as having 19 787-9s on order, with letters of intent also covering eight smaller -8 examples

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THE WEEK IN NUMBERS

84.6%

Flightglobal dashboard

A record Q2 load factor for Southwest Airlines was tempered by an expected 4-5% fall in passenger revenue

\$3.1bn

Flightglobal Ascend data

The base-price value of finance sought by Turkish Airlines for 17 Airbus and 26 Boeing aircraft – and a spare GE90

187

NASA's ISS Reference Guide

The number of spacewalks from the International Space Station since 1998; it has hosted more than 200 visitors

QUESTION OF THE WEEK

Last week, we asked:

Airbus's MRTT victory over Boeing in South Korea: You said:

71%

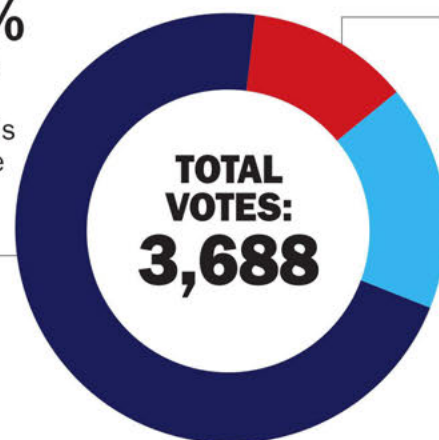
Last win before KC-46A is available

12%

Market has room for other platforms

17%

Confirms seismic shift in tanker market



This week, we ask: A joint Russian-Chinese widebody project:

- ☐ Ready for take-off
☐ Of limited appeal ☐ Never going to happen

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The Power of Flight

Rolling on the river

As the Trent flows past Rolls-Royce's Derby home, aero engines of that name stream from the drawing boards and assembly lines of the famous manufacturer – but not steadily enough

Rolls-Royce, says its finance director David Smith, is “seeing the negative effects of a very successful outcome last year”. For sure, to be a victim of success is better than being a victim of failure, but it would be happier times for the world's number two aero engine maker if the challenge of managing an output gap between two Airbus programmes was the end of it.

Smith, detailing the whys and wherefores of a fourth profit warning in 18 months, was referring to a looming decline in Trent 700 sales as Airbus winds down the A330 programme, where orders are 84% Rolls-powered, and readies the A330neo, a hot seller that Airbus last year declared would be offered exclusively with the 700's successor, the Trent 7000 – which will enter service from 2017.

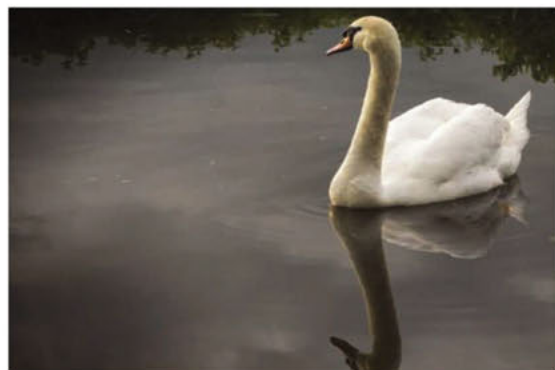
But doth Rolls-Royce protest too much? There are, after all, some very attractive upsides for the core widebody engines business. Airbus is ramping-up production of its blockbuster A350 programme, powered

Rolls-Royce is a powerhouse but arch-rival GE is far bigger and much more profitable

exclusively by the Trent XWB. Boeing has hundreds of Trent 1000-powered 787s to deliver.

The Trent 700-to-7000 transition is not, in fairness, a small matter – and it is not the full extent of Rolls-Royce's troubles, many of which flow from a marine business that many investors would like shot of. But the episode casts light on three problems at Rolls, all of them serious and all of them related.

Essentially, the company does not make enough money, the company does not invest enough money



Paddling furiously underneath

and the company may well be too diverse. Deciding what to do about these matters, and working out whether management has enough grip on quality and process control, is surely a priority for new boss Warren East.

East, who took over at Rolls the day before last week's profit warning, knows a thing or two about competing successfully against industry behemoths: in his previous job as head of Cambridge-based microprocessor maker ARM he turned the British pretender into a serious rival to giants like Intel. That experience should serve him well in battle against GE, his new nemesis.

East will be keenly aware that while Rolls-Royce is a powerhouse, GE is half as big again – and much more profitable. When trying to manufacture cutting-edge products rapidly and to perfection while pushing the limits in research and technology, size matters.

Rolls-Royce is probably good enough – but is it big enough? If not, it needs more capital. To get that, East will need to show investors that more cash will actually turbocharge profits. ■

See This Week P7, Air Transport P10

Keep your friends close

Russia and China may be inching closer to what could be the most ambitious aircraft programme of the next decade: a jointly developed widebody.

Domestic orders will come easily enough from China's state-run airlines, and the Kremlin could also influence Russian carriers to do the patriotic thing.

But to have any hope of international sales, the aircraft must at least match the 787 and A350 and come with a support network to ensure dispatch reliability of over 99% – a tall order, given that China's only jetliner, the Comac ARJ21, has yet to enter service, and Russia has never built an economically viable widebody.

These engineering and logistical challenges may well be dwarfed by an even more basic problem – actu-

ally working together when neither side really trusts the other. China has a history of obtaining Russian military technology through dubious means, and Russian engineers will not forget this in a hurry.

Pride, too, may intervene. Beijing sees home-built aircraft as the mark of a powerful, prestigious nation. Most visitors to Comac's vast research campus will leave with the view that China has the means – and desire – to go it alone. The Russians tend to talk far more about a joint effort than do their nascent partners.

Building a new widebody is never easy, but managing a relationship between two proud, ambitious partners could prove even harder. ■

See This Week P7



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BRIEFING

QAZAQ JUMPS THE Q WITH FALCON TURBOPROP DEAL

LEASING Kazakhstan's new state-backed regional operator, Qazaq Air, is to initiate services with three Bombardier Q400s leased from Abu Dhabi's Falcon Aviation Services. The airline, previously known as Air Kazakhstan before a rebranding, is backed by the Kazakh sovereign fund Samruk Kazyna. Qazaq Air chose the Q400 for its "speed and range" across long domestic sectors in Kazakhstan, says the fund's project director, Blair Pollock.

INDIGO NEO DEAL EXPIRES BUT TALKS CONTINUE

AIRLINES InterGlobe Aviation, parent of Indian low-cost carrier IndiGo, has disclosed that a memorandum of understanding signed last year for 250 Airbus A320neo-family aircraft has expired. "Although the term sheet has expired, we remain in active discussions concerning the potential acquisition of a significant number of aircraft from the A320neo family," says InterGlobe. In 2005, IndiGo placed an order for 100 A320s, followed by a firm order for a further 180 aircraft in 2011.

ALCOA BULLISH DESPITE SLOW START FOR A350

SUPPLY CHAIN In its second quarter report, Alcoa has dropped its 2015 aerospace sales forecast by a point to 8.9% on a slower-than-expected ramp-up of Airbus A350 and Bombardier CSeries production. But "the ongoing strength of the sector" led the metals supplier to nearly double its growth projections for 2016 and 2017, to 8% and 13%, from 4.5% and 6% respectively. The company is shifting its focus from commodity metals to more profitable "downstream" businesses, like forgings and castings for aero engines.

LOCKHEED, TEXTRON 'IN RUNNING' FOR SIKORSKY

STRATEGY Lockheed Martin and Textron remain in the running to buy helicopter maker Sikorsky, but Boeing is no longer pursuing a deal and Airbus Group is not interested, says a Reuters report. Pratt & Whitney parent United Technologies announced earlier this year it intends to sell Sikorsky, whose most successful product is probably the UH-60 Black Hawk. Textron already owns Bell Helicopter, while Lockheed is a partner with Sikorsky on several US government helicopter projects, notably the MH-60R Seahawk.

ITALY, MALTA DEALS BOLSTER AW139 BACKLOG

ROTORCRAFT AgustaWestland has secured new follow-on orders for its strong-selling AW139 intermediate twin. The first is from the Italian coastguard, which will take an additional two examples, to increase its fleet of the type to 10. Four more are covered by options. In addition, Malta's armed forces will add a third AW139 to its fleet of the Italian-built type.

FIRST DREAMLINER AT HOME IN NAGOYA

TRANSFER Boeing on 7 July donated the first 787 to Nagoya Chubu Centrair International airport. Aircraft ZA001 was first flown on 15 December 2009, with its use having been focused on aerodynamics, flight control and system performance testing.

IRON DOME ON TARGET AGAINST UAV THREAT

TESTING Rafael has tested its Iron Dome counter-rocket, artillery and mortar system against unmanned air vehicle targets at high and low altitudes. The Israeli company says Iron Dome – which has made more than 1,500 intercepts to date – does not require any modifications for the counter-UAV mission.

RESTRUCTURE JAMES DREW WASHINGTON DC

US Army rehomes surplus rotorcraft

Aviation shake-up shifts 119 Bell OH-58 Kiowas and TH-67 Creeks to roles including counter-narcotics and training

The US Army has already found homes for 119 of the combined 652 Bell OH-58 Kiowa and TH-67 Creek helicopters that have been displaced under the service's aviation restructure initiative, according to a recent report provided to Congress.

Sixty TH-67s are being transferred to the US Department of Justice, to support its operations in Colombia, such as counter-narcotics tasks. Another 20 are being transferred to the army's combat training centre and five are moving to the US Navy's test pilot school.

The army is keeping five Kiowas as prototype test aircraft and another 24 for parts reclamation. With the remainder of the 119 identified aircraft listed as "pending attrition", this has left 307 OH-58Ds, 130 OH-58A/Cs and 96 Bell 206B-3 JetRanger-based TH-67s that are available

for reuse or transfer as of 4 May.

Surplus aircraft are available due to the army's controversial aviation shake-up, which retires the OH-58 fleet and replaces the TH-67 with the twin-engined Airbus Helicopters UH-72 Lakota. This is expected to save \$12 billion up front and a further \$1 billion annually in avoided operating and support costs.

Eight countries have expressed interest in buying OH-58Ds, with the report having forecast demand to transfer 41 between now and 2019.

The armed scout helicopters can be sold internationally via the US government's Foreign Military Sales process, and would be "incapable of safe flight operations following the removal or demilitarisation of equipment without significant engineering design change and modifications", the report notes. ■

DELIVERY

Finland takes final NH90 transport



Patria has assembled 19 out of the 20 examples ordered in 2001

Finland's Patria has handed over the last of 20 NH Industries NH90 troop transport helicopters from a 2001 contract to the Finnish army during a ceremony at its Halli production facility.

Patria has assembled all but one of Helsinki's NH90 fleet, with the initial rotorcraft built by NHI majority shareholder Airbus Helicopters at its Marignane, France plant.

First flight of a Finnish NH90 took place in 2004 and deliveries began four years later. Since then the fleet has accumulated a total of 7,500 flight hours.

Patria, which also assembles examples of the 11t-class rotorcraft for Sweden's armed forces, has already begun work on a retrofit programme for the Finnish fleet. ■



Bluecopter displays green credentials
THIS WEEK P8

PROPULSION KATE SARSFIELD LONDON

Rolls reversed as business jet slowdown adds to woes

UK engine manufacturer retains faith in segment despite lack of a clear long-term strategy

Engine manufacturer Rolls-Royce has stressed the continued importance of business aviation to the UK firm, despite falling demand in the segment contributing around £50 million (\$77 million) of an expected £300 million profit "headwind" in 2016.

The bulk of the £300 million charge will come from its Trent 700 programme for the Airbus A330, with weaker demand in the regional jet aftermarket also contributing – but it also illustrates the problems R-R is experiencing in business aviation.

Not only has R-R been hit by the falling production rates of Bombardier's flagship Global 5000 and 6000 – powered by the BR710A2-20 – but it has also been losing market share to its rivals in the lucrative large-cabin sector.

Dassault, for example, selected Snecma's Silvercrest for its new wide-cabin 5X, despite R-R holding that position early on in the design phase. Most recently, R-R also lost out to Pratt & Whitney



Dassault has selected Snecma's Silvercrest for its wide-cabin 5X

Canada to supply the powerplant for Gulfstream's new G500 and G600 – despite having been the preferred engine provider for the US airframer for many years.

"We have not won a number of key platforms over the last few years," said R-R's chief finance officer David Smith, during a 6 July investor call. Nonetheless, R-R remains "very confident" about the business jet market, he says, and the sector "is very important" to its future strategy. "We are still in-

vesting in technology and making sure we have the right routes to market in the future," he says.

Richard Evans, senior consultant at Flightglobal's Ascend consultancy, says R-R's decline at the top-end of the sector is a concern.

"It's not going to be there in the future, and that's the area of the market that's been growing the fastest. Everybody will be concerned they have lost their dominance at the top end," he says. ■

See Air Transport P10

DEVELOPMENT DAVID KAMINSKI-MORROW LONDON

CSeries up to speed in unstick tests

Bombardier has disclosed details of the minimum-unstick testing on the initial CSeries variant which it conducted at a regional airport in Kansas.

One of the CS100 prototypes, FTV-4, performed the tests at

Salina airport during May. The twinjet was fitted with a projecting bumper underneath the aft fuselage for the tests, which explore the minimum speed at which the CS100 can lift off at high nose attitude.

FTV-4 project flight-test engineer Allan Smith says the test is "one of the most dangerous" because it requires the bumper to make contact with the runway surface as the aircraft accelerates.

Minimum-unstick testing involves rapid acceleration to a threshold speed, then reducing power and applying maximum pitch. FTV-4 was fitted with cameras underneath the fuselage to monitor the bumper. Footage dated 21 May indicates the aircraft lifting off during one test at a speed of 100kt (185km/h), with a nose-up pitch of around 13°.

Bombardier confirms it has completed the minimum-unstick test regime with the type. ■



The CS100 was fitted with cameras to monitor its aft fuselage

PROPOSAL TOM ZAITSEV MOSCOW

Russia outlines joint widebody vision to China

Russia's government has outlined its vision for a proposed widebody to be developed jointly with China.

Deputy prime minister Dmitry Rogozin – who has responsibility for the national aerospace industry – sketched ideas for the project after his Chinese counterpart Wang Yang visited Irkut's production facility in Irkutsk.

"You have seen how a prototype of the MC-21 twinjet is nearing completion at the final assembly hall," said Rogozin, addressing the Chinese vice-premier.

"We're prepared to undertake a project to jointly develop and build a widebody aircraft type based on these technologies."

As an example, Rogozin suggests a modular approach to fuselage construction. This, he suggests, "would enable us to make fuselage longer or shorter and choose its optimal size depending on customers' capacity and range requirements".

"We're prepared to undertake a project to jointly develop and build a widebody aircraft type"

DMITRY ROGOZIN
Russian deputy prime minister

"I think it's high time to pass from signing agreements in principle to practical issues," he says. "These would include determining responsibilities as well as the financial, engineering and technical contribution of each party to the project."

"After that, we'll line up system and component suppliers on our side."

Rogozin believes Russian manufacturers should deliver composite wings for the planned widebody, given competencies they have gained in making them for the MC-21. ■

See Air Transport P12



EXPORTS BETH STEVENSON LONDON

CybAero gets go-ahead for UAV delivery to China

Swedish company CybAero has been granted an export licence to sell 70 of its Apid unmanned air vehicles to the Chinese state-owned airframer AVIC, allowing the first of the 180-220kg (396-485lb) type to be delivered shortly.

Approval for the deal was given by Sweden's export control agency on 26 June, following "highly extensive" factory and flight testing carried out earlier that month.

An eight-year framework agreement for 70 of the vertical take-off and landing type, plus one demonstrator, was signed in

July 2014 and is valued at some SKr700-800 million (\$82.7-94.5 million). The first demonstrator model is now likely to be delivered later this month.

"The system CybAero is delivering meets requirements and will be commissioned as early as August," says Mikael Hult, CybAero chief executive.

CybAero received a notice covering the first five systems under a framework agreement in March 2015. These are now in production and will be delivered to distributor ACC in the third quarter of this year.

"We have now initiated the de-



Demonstrator is due to arrive this month, with 70 more to follow

livery phase of our largest-ever order, which feels extremely exciting," Hult says. "CybAero is now taking the step from being a development company to becoming a production company."

China is a key market for Cyb-

Aero – in January the Chinese government's customs department ordered three systems, which will be based on three new ships dedicated to customs control, port management and anti-smuggling operations. ■

ROTORCRAFT DOMINIC PERRY DONAUWÖRTH

Bluecopter displays green credentials

Modified H135 prototype trials aerodynamic and rotor efficiency improvements, but single engine operations may be key

Airbus Helicopters has unveiled a new demonstrator that brings together a basket of new and existing platform-agnostic technologies aimed at drastically cutting fuel consumption and noise levels. For the first time, these include the possibility of safely operating a twin-engined helicopter in normal flight using just one powerplant.

In gestation since 2011,

Bluecopter, as the manufacturer calls it, has accumulated 28h across two flight-test campaigns. It is targeted at cutting fuel burn by as much as 40-50%, says chief technology officer Jean-Brice Dumont.

Publicly unveiling the Bluecopter at an event at its Donauwörth, Germany site on 7 July, Dumont said it had added so many incremental improvements to its test airframe, the first

prototype of the H135, "that there is not so much left from the original aircraft".

Modifications include a next-generation shrouded Fenestron tail rotor which features optimised blades and stators, a T-tail to bring the horizontal stabiliser out of the path of the rotor wash to improve stability and lift, an active rudder to reduce the "stress" on the Fenestron, a reshaped rear fuselage, aerodynamic skid covers, a bearingless main rotor featuring five curved Blue Edge-style blades – 50cm (20in) longer than those in the regular H135 – and a main rotor hub fairing.

The changes, notably the increase in rotor efficiency, have reduced the required power by around 15%, says Dumont, as well as increasing payload.

However, potentially the most transformative technology is single engine operation, he says, which raises the possible fuel burn saving to 35-40%.

At present, the system simply alerts the pilots that they are within certain parameters – a

speed of about 120kt (222km/h) and altitude of between 1,640-5,000ft – to enable one engine to be safely shut down. Restart takes about 20-30s, says Marius Bebesel, programme manager research and innovation.

However, Dumont says the eventual goal is to automate the system, "to add intelligence" that allows the FADEC to control the shutdown or restart once "eco mode" is selected.

Airbus Helicopters has been working with engine supplier Pratt & Whitney Canada to implement the change to the FADEC software on the latter's PW206 turboshafts and hopes to trial a more automated system later this year, says Bebesel. The enhancement could be applied to any twin-engined helicopter without the need for changes to dynamic components, Dumont believes.

Phase one of the flight-test campaign ran from April to October 2014, with a second effort kicking off in early 2015 to terminate towards year-end. ■

See News Focus next week



Some 28h of flight tests have been performed since April 2014



R-R loses thrust
from weak
Trent 700
AIR TRANSPORT P10

THIS WEEK

BACKLOGS DAVID KAMINSKI-MORROW LONDON **STEPHEN TRIMBLE** WASHINGTON DC

Paris push aids Airbus first-half sales

Success in narrowbody segment sees European manufacturer edge six-month order race, but Boeing wins on widebodies

Airbus outstripped Boeing in the first-half orders contest, recording a total of 348 net orders against 281 for its rival. However, the situation is reversed on deliveries, where Seattle handed over 381 commercial aircraft against 304 from Airbus.

Analysis of the order data for the first half of the year shows that Airbus dominated Boeing in the narrowbody segment, selling 290 A320-family jets, including the re-engined Neo model, against 203 current and future 737 twinjets. It also saw deals for a total of 58 A330s – 32 current-generation examples and 25 A330neos – which includes an additional -200 variant for US lessor Air Lease, taking its commitment to the type to 10 aircraft.

That order was sealed after the Paris air show, where Air Lease signed for an A350 and four A320-family jets. Other deals unveiled at Le Bourget included an order for 50 aircraft, including 20 A330-300s, from lessor IAF. All of the jets will be taken by Saudia, with the A330s configured as the high-density regional version.

Airbus also booked a deal from lessor GECAS for 60 aircraft – 45 A320neo and 15 A321neo jets.

Airbus also includes in the June backlog data the nine A320-family aircraft ordered by Peach Aviation and VietJet.

Sales at Boeing cooled slightly during the period, in line with the company's expectation to achieve an even book-to-bill ratio of 1:1 for the full year.

Demand for new aircraft has weakened as Boeing focuses on delivering sold-out backlogs for the 737 and 787, while attempting to ramp up production and

introduce improved new models. But the sales fall also comes as Boeing attempts to prop up demand for the current versions of the 777 and the 747-8. Airlines signed for 49 777 aircraft in the first half of 2015, but that total included 10 orders for the re-engined and re-winged 777X.

Orders for 39 more 777-300ERs and 777Fs combined raised Boeing's backlog to 257 aircraft. It needs to add at least 200 orders for the 777 over the next three years to keep the big twin's production rates stable through the transition to the 777X family. ■

1H NET ORDERS & DELIVERIES

Boeing	Orders	Deliveries
737	203**	249
747	4	9
767	1	9
777	49**	50
787	24	64
Total	281	381
Airbus	Orders	Deliveries
A320	290*	238
A330	57*	49
A350	1	4
A380	0	13
Total	348	304

NOTE: *Includes Neo variants. **Includes Max and 777X variants. SOURCE: Manufacturers

DELIVERIES

A350 lags behind target as Dreamliner hits its stride

Halfway through the year, the production ramp-ups at Airbus and Boeing are mostly on track – but there are some signs of sluggishness in Toulouse.

While Boeing delivered 381 aircraft in the first six months of 2015 – including 64 787s – Airbus handed over 304 aircraft during the same period.

Airbus's delivery totals included only four A350-900s – well below the rate required to match its plan of 15 deliveries of the type in 2015.

By contrast, the 787 programme is running slightly ahead of Boeing's 10-a-month schedule.

On the A380, Airbus made 13 first-half deliveries – slightly behind where it needs to be to achieve its

goal of 30 deliveries for the full year.

The airframer also handed over 238 A320-family narrowbodies during the period, which compares with Boeing's total of 249 737s.

If it maintains its current edge for the remainder of the year, it will be the first time since 2007 that Boeing has delivered more single-aisles than its rival. ■

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PROPULSION DOMINIC PERRY LONDON

R-R loses thrust from weak Trent 700

Manufacturer forecasts £250 million profit hit from A330 engine line as it works to transition to Neo powerplant in 2017

Delivering a profits warning covering Rolls-Royce's core aerospace propulsion business was almost certainly not how Warren East, the company's new chief executive, imagined he would be spending his second day in the role.

"It's not how I envisaged my first communication with the market," East admitted to analysts during a 6 July call to explain the "headwinds" afflicting its civil aerospace unit.

But with its half-year results to be released at the end of this month, the urgency for R-R to break the bad news to the market was clear.

The numbers – the fourth profits warning in under two years – make for grim reading.

Although revenue and profit forecasts for 2015 remain within guidance, the engine maker is already seeing weakness in two core markets – the Trent 700 for the Airbus A330, and powerplants for high-end business jets – which will have a £300 million (\$462 million) impact on 2016's profits. And, admits chief financial officer David Smith, that figure is likely to be repeated in 2017 as well.

R-R's problem with the Trent 700 is twofold. Weaker demand for the current-generation widebody in the run-up to the arrival in 2017 of the re-engined A330neo has been coupled with fierce pricing by engine manufacturers to win positions on the remaining backlog.

Although R-R will exclusively power the Neo model with its Trent 7000 engine, on the current iteration it faces competition

"Pricing is a big factor [with A330 engines] and that's where all of us underestimated the impact"

DAVID SMITH

Chief financial officer, Rolls-Royce



Although it has claimed a 60% market share of the in-service A330 fleet, competition remains fierce

from Pratt & Whitney and GE Aviation with their respective PW4000 and CF6 models.

"We are seeing the negative effects of a very successful outcome last year," says Smith, alluding to R-R's selection by Airbus as sole powerplant provider for the A330neo.

REDUCTION

Airbus has been attempting to bridge the gap to the arrival of the re-engined model, but with only moderate success so far. It has already announced an output reduction from 10 to six aircraft per month from January next year, but has not ruled out further rate cuts.

Deliveries of Trent 700s – including both original equipment and higher-margin spare engines – will drop this year by nearly a quarter, to around 140 from 184 in 2014, says Smith, who forecasts an additional fall to between 80-100 in 2016, with that level maintained into 2017.

There are still engine campaigns up for grabs, says Smith, "but we don't know how many we will win".

Flightglobal's Ascend Fleets database records that there are currently 87 A330s on order or

covered by tentative agreements where no engine selection has been made. An additional 75 of the widebodies detailed in a recent memorandum of understanding with China are also yet to have engines assigned.

Although R-R has around a 60% share of the in-service A330 fleet – rising to 84% for firm orders – with such keen pricing there is no guarantee this will be replicated across the remainder of the backlog. "Pricing is a big factor here and that's where all of us underestimated the impact as we thought about it," says Smith.

However, audibly frustrated analysts repeatedly asked how R-R could have read the tea leaves so badly in what is meant to be its core area of expertise – particularly for an engine that Smith calls "one of its most successful ever".

Smith says it is reviewing the potential market "airline by airline", describing it as "a quite uncertain environment".

Richard Evans, senior consultant at Ascend, says the Trent 700 has become "almost the default option" on the platform "but now we are at the tail-end of the programme, everybody is fighting over what's left."

While the medium-term outlook for R-R is unclear, East remains confident in the "outstanding long-term prospects" for the business.

Key to that, he says, is the move from around 30% of the installed engines on widebody aircraft to 55% in the future, with the Trent XWB, 1000 and 7000 at the forefront of that rise.

OPPORTUNITY

Further out, there is likely to be the opportunity to additionally grow its share of the widebody segment if Airbus launches a re-engined version of its A380.

However, despite admitting its interest, Smith is adamant that it will only participate in the programme "if we see a clear business case".

That rationale, says Evans, may be difficult to establish. "I find it difficult to see how you can make an incremental business case," he says. "Developing an all-new engine costs a couple of billion dollars. If you think the incremental market is only a handful of aircraft and the only one buying it [Emirates] drives the keenest price you have ever seen, I'm not sure how you square that circle." ■



Cargolux crews could strike over 'safety and trust' issue
AIR TRANSPORT P12

INVESTIGATION DAVID KAMINSKI-MORROW LONDON

Unsafe oxygen generators carried on Flydubai 737-800

Unsecured hazardous materials transported on commercial service after modification work

Middle Eastern budget carrier Flydubai has tightened its procedures after an investigation found it had inadvertently transported unsafe chemical oxygen generators following maintenance on Boeing 737-800s.

Oxygen generators are classified as dangerous goods and are prohibited from carriage on passenger aircraft because they pose a fire risk. United Arab Emirates investigators found that a Flydubai 737-800 (A6-FEB) had been loaded with six generators after a C-check and seating modification in Amman by Jordanian maintenance firm JorAMCo.

It carried out a ferry flight, with two pilots, back to Dubai on 6 December 2013, at which point the generators were discovered.

The UAE's General Civil Aviation Authority says the generators had "not been made safe" with a safety cap or safety pin in the firing mechanism.

Its investigation found that eight previous aircraft had undergone the same modification work, involving removal of passenger service unit assemblies.

Twenty-seven assemblies, each containing an oxygen generator, had been removed and stored.



One of the two flights carrying the assemblies had 171 occupants

Nine had subsequently been transported back to Dubai – six on 6 December, and three on board a previously-modified aircraft (A6-FDR) on 28 November.

This earlier flight was operated as a commercial service, departing from Amman's passenger terminal with 171 occupants. The generators carried on this flight were not detected at the time.

The General Civil Aviation Authority's inquiry says that the seating modification required removing three passenger service unit assemblies from the aircraft.

Engineering orders prepared by TIMCO, which held the supplemental type certificate for the work, did not directly reference warnings about the presence of hazardous materials or give guid-

ance on the handling, storage and transport of the generators.

After the assemblies were removed they were "not treated correctly as dangerous goods", says the inquiry. They were not labelled as hazardous and their generators were not made safe.

Although Flydubai's quality-assurance department had carried out an audit of JorAMCo earlier in the year, this did not include the stores, which meant that issues relating to storage and labelling of dangerous goods were unknown to the carrier.

Both Flydubai and JorAMCo have since implemented improved safety procedures for complex maintenance, particularly when work includes handling of hazardous materials. ■

STRATEGY
EDWARD RUSSELL WASHINGTON DC

Boeing, Airbus in competition for Vietnam market

Airbus and Boeing are fighting for primacy in Vietnam, with both signalling interest in the country in recent weeks.

The former – which already counts carriers Vietnam Airlines and VietJet Air as customers – is considering expanding its industrial presence in the nation.

"Airbus Group is planning to develop further its industrial presence in the country," it says, adding that this would look across all the group's divisions, as well as civil aircraft.


Meanwhile, Boeing has signed two memoranda of collaboration with Vietnam Airlines and VietJet. The agreement with the former covers the potential acquisition of eight 777-8Xs and eight 787-10s as part of a fleet expansion strategy.

"If we decide in the next few years to come, we hope that we may be launching the [777]-8X," said the airline's president and chief executive Pham Ngoc Minh at an event marking the ceremonial handover of the carrier's first 787-9 on 6 July.

Boeing's agreement with VietJet will explore the possible sale of narrowbodies including the re-engined 737 Max, as well as widebodies, to the currently all-Airbus operator. ■

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DEVELOPMENT

DAVID KAMINSKI-MORROW
LONDON

Russian MC-21 takes shape as Aviastar shines

Russian airframer Aviastar is preparing to transfer another newly-completed section of the Irkut MC-21's fuselage to the assembly line.

The section includes the rear bulkhead for the aft passenger cabin as well as structures supporting the horizontal stabiliser and vertical fin.

Aviastar says the component will be moved to the assembly line in Irkutsk in the course of "the next few days".

"This is one of the final sections of the aircraft's fuselage," says MC-21 project manager Vasily Dontsov.

He adds that the next stage in the construction will be the development of the auxiliary power unit compartment.

Ulyanovsk-based Aviastar is already working on fuselage panels for a second MC-21 prototype, while other parts – such as passenger doors – are undergoing testing.

It puts the number of firm orders for the 146- to 211-seat aircraft family at 175, out of a total of 273 commitments. ■



Fuselage sections will transfer to Irkutsk for final assembly



Staff representatives at the freight carrier say management "failure" has damaged working culture

WORKFORCE MICHAEL GUBISCH LONDON

Cargolux crews could strike over 'safety and trust' issue

Trade union and pilot representatives warn that they are considering walkouts at carrier

Flightcrew at Cargolux are threatening industrial action over what they perceive as a steady erosion of the safety culture at the freight carrier.

Trade union LCGB says that "safety and trust cultures" at the Luxembourg-based airline "have majorly suffered", citing management "failure".

Together with Luxembourg's ALPL pilots' association, LCGB is canvassing flightcrew's views on potential action, up to and including walkouts. "Union measures ranging up to a strike can no longer be ruled out," says LCGB.

It alleges that four pilots were monitored by private investigators and dismissed "without any prior warnings" for not turning

up to work even though they had "valid sicknotes". Managers did not follow existing HR procedures, LCGB claims.

The union also alleges the airline opted not to discipline other pilots who performed a "wing-wave" manoeuvre during take-off on a Boeing 747-8F delivery flight from Seattle in September. These pilots "only narrowly avoided a catastrophe", LCGB says.

Management has put the "entire safety culture at risk", it adds.

A protest walk was also organised for 8 July.

Cargolux declines to comment.

Luxembourg airline Luxair owns slightly more than 35% of the firm, with another 35% held by Chinese firm Henan

Civil Aviation and Investment (HCAI). The remaining shares are owned by other entities in the grand duchy.

HCAI invested in the carrier in April 2014. Since then, the pair have been working together to develop services to Zhengzhou in China, with 10 flights per week now operated. Subsidiary Cargolux Italia has also begun serving the Chinese city from its Milan hub.

And, during a meeting last month, the parties signed two memoranda of understanding covering the creation of a jointly-owned China-based freight airline and setting up a joint-venture maintenance and engineering facility in Zhengzhou. ■

TECHNOLOGY DAVID KAMINSKI-MORROW LONDON

Elbit Systems gives ATR enhanced-vision capability

ATR's latest turboprop family is to be offered with an enhanced-vision capability that has been developed by Israeli specialist Elbit Systems.

The -600 series will be offered with the wearable Skylens visor,

either as a new-build option or a retrofit. Elbit says that ATR will be the launch customer for Skylens, which, it states, replaces traditional head-up displays.

The visor, which resembles flight goggles, is worn on the

pilot's head and feeds high-resolution imaging to increase their situational awareness in low-visibility conditions.

Elbit points out that turboprops often serve airports without the same level of approach and

landing guidance that are found at larger facilities.

ATR chief Patrick de Castelbajac says the "leading-edge development" will provide increased safety and "more operational flexibility". ■



**USAF reveals
Raptor upgrade
details
DEFENCE P14**

INVESTIGATION DAVID KAMINSKI-MORROW LONDON

Inquiry reveals take-off policy muddle

Taiwanese investigators say pilots of ill-fated turboprop should have aborted departure but acknowledge airline's failings

Pilots of an ill-fated TransAsia Airways ATR 72-600 should have aborted its departure from Taipei Songshan airport after noting that a power-control system had not armed, investigators have indicated.

Flight GE235 crashed into the Keelung river shortly after take-off when the crew inadvertently reduced power from its healthy left-hand engine, instead of the right-hand one, which was exhibiting problems. Taiwanese investigators have disclosed that the aircraft's automatic take-off power control system (ATPCS) had not initially been armed when the turboprop began its departure roll.

The system provides automatic support – including uptrim and auto-feathering – in the event of an engine failure during take-off.

Investigators probing the fatal 4 February crash, citing flight-recorder data, state that the monitoring pilot, in the right-hand cockpit seat, declared the ATPCS was not armed about 4s into the take-off roll.

In an interview with the inquiry team, a TransAsia crew training supervisor said that ATR 72-600 pilots should abort take-off if the ATPCS is not armed during the roll, and that this point was "emphasised" during pilot training.

The requirement to abort arises because there are several procedures to carry out if the ATPCS is not armed, and these should not be performed during the take-off run.

But the inquiry points out that



The crash killed 43 of the 58 passengers and crew on board

this policy of aborting is "not clearly described" in any manuals and notices to flightcrew. The situation is complicated by a policy allowing pilots of ATR 72-500s, faced with the same issue,

to continue take-off under certain conditions.

TransAsia flight GE235's commanding pilot acknowledged the unarmed ATPCS call-out but opted to proceed with the take-

off. Just after the standard 70kt (130km/h) speed call, the monitoring pilot exclaimed that the ATPCS had become armed, a few seconds before the ATR became airborne.

Some 34s into the climb, the ATPCS appears to have commanded an uptrim to the left-hand engine, to increase its power, and started auto-feathering the right-hand engine – these actions are the ATPCS system's normal response to a developing problem in the right-hand powerplant.

Investigators have still to conclude the reasons for the initiating event that led to the auto-feathering of the right-hand engine. ■

INQUIRY

Commander cut power to wrong engine despite warning

Although the sequence of events in the TransAsia crash is clear, a number of questions are unanswered.

There is as yet no explanation for the hasty reaction and the failure to identify the problematic engine, which resulted in the opposite powerplant being shut down.

Three highly-experienced pilots – with nearly 28,000h between them, including more than 15,000h in ATRs – were in the cockpit at the time, including two captains, in the left- and right-hand seats.

The commander's declaration that he would reduce power on the left-hand throttle came just 8s after the initial signs of a problem, when

the automatic take-off power control system initiated an uptrim of power from the left-hand engine.

Taiwan's Aviation Safety Council states that the uptrim was part of an automated compensation sequence. The master alarm triggered and the ATR's engine and warning display issued an alert.



Flight GE235's right-hand powerplant suffered failure

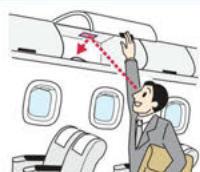
This alert identified the right-hand engine as the source of the problem and drew up the checklist procedure for a flame-out of this powerplant at take-off. The procedure includes reducing the right-hand throttle lever to the flight-idle position.

However, the commander had begun to pull back the left-hand throttle within 6s of the master alarm, before the second captain had started reading the checklist items. During the checklist reading the commander again mentioned reducing the left-hand throttle, and pulled the lever back further, even as the second captain confirmed a flame-out on the right-hand engine. ■

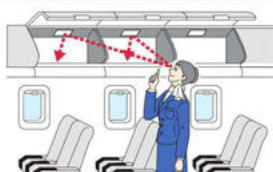
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UNMANNED SYSTEMS

Payload test campaign to bolster Global Hawk

A pair of the US Air Force's Northrop Grumman RQ-4B Global Hawk unmanned air vehicles will be adapted to fly with the Lockheed U-2's most valued surveillance sensors from early in fiscal year 2016, with the parties close to finalising a co-operative research and development agreement for the work.

The company has received a formal request to install the U-2's United Technologies Aerospace

Systems-produced senior year electro-optical reconnaissance system sensor and optical bar camera with the RQ-4B, and also the Northrop E-8C Joint Surveillance Target Attack Radar System platform's MS-177 camera.

Physical changes to the Global Hawk will include adding a large, canoe-shaped sensor bay beneath the fuselage, containing 17 new payload adaptor fixtures. Software and mission system changes



RQ-4 additions will include sensors already carried by the U-2

es will support each sensor's power and cooling requirements.

"The modification is anticipated to be completed approximate-

ly 24 months after a signed agreement," says the service, which expects to award a contract during FY2016. ■

MODIFICATIONS JAMES DREW WASHINGTON DC

USAF reveals Raptor upgrade details

Mandatory report highlights range of activities to tackle structural and reliability issues hindering air superiority fighter

The US Air Force might have the world's greatest air superiority asset in the Lockheed Martin F-22, but the type came with major structural flaws that are still being addressed.

One \$350 million programme in particular is making a mix of five major structural changes to 162 of the USAF's 183 Raptors, including a mid-fuselage and engine bay retrofit, just to enable the airframe to reach its promised service life of 8,000 flight hours.

Another effort – the reliability and maintainability maturation programme (RAMMP) – is buying more than 10,800 upgrade kits through 2020 at a cost of more than \$1.7 billion, including \$177 million on developing the modifications. These will deal with various deficiencies, from a landing gear light that does not always work to a \$30 million upgrade of the pilot's primary multifunction display.

US lawmakers passed legislation in 2013 that requires the USAF to report its modernisation activities on the F-22. According to the latest report, seen by *Flight International*, RAMMP has "steadily improved" the aircraft's mission fleet availability rate, which currently stands at 62.8% – compared



Retrofits are needed if the F-22 is to achieve 8,000 flight hours

with the average of 40% when the type entered service in 2005.

The structure retrofit programme (SRP) is about 64 jets through its 162-aircraft programme of record, with work expected to wrap up in 2021 – about one year later than predicted in 2014.

The report says the air force has almost completed the transfer of the structural repairs programme to its Ogden Air Logistics Complex (ALC) at Hill AFB in Utah.

The work had previously been performed at Lockheed's Palm Dale plant in California, but the service favours doing this itself, because of "cost, schedule and quality issues". Lockheed deliv-

ered about half the number of aircraft it was supposed to in fiscal years 2012 and 2013, and that performance level continued through 2014, the report shows.

"Installs fell short in FY2012 through FY2014, primarily due to poor contractor performance," the document says. "Since SRP operations have been consolidated at Ogden ALC, delivery performance has been very close to the current scheduled plan."

The USAF is currently retrofitting nine aircraft at a time, with the process taking an average of 131 days to complete. The report notes that the programme has been stretched out to 2021 be-

cause four of the 13 depot lines are being used to repair the stealth coating around the aircraft's engine inlets, which is a more immediate priority.

The air force says the Raptor's availability improved by 3% since the last report, and that the average number of maintenance man-hours per flight hour has dropped from 46.6h in 2012 to 41.9h in 2014.

The report says RAMMP, which began in 2005 and is funded through 2020, is an "effective, efficient and viable programme" that continues to meet its goals.

Concurrent with SRP and RAMMP, the F-22 fleet is also undergoing a multi-billion dollar upgrade to the Increment 3.2 configuration. This adds improved data link and automatic ground collision avoidance systems, integrates the latest Raytheon AIM-9X Block II and AIM-120D AMRAAM air-to-air missiles and has a redesigned oxygen system to prevent pilots from experiencing hypoxia-like symptoms.

The US Government Accountability Office reported in 2014 that the combined cost of F-22 modernisation is \$11.3 billion. More than 60% of that total has been spent since 2003. ■



Australia goes to
Qantas for KC-30As
DEFENCE P17

PROMOTION BETH STEVENSON LONDON

European debut at RIAT for P-1 maritime patrol aircraft

Two examples of Japanese type expected to participate in the Royal International Air Tattoo

The Japan Maritime Self-Defense Force's (JMSDF) Kawasaki Heavy Industries P-1 maritime patrol aircraft will make its international debut at the Royal International Air Tattoo (RIAT) in mid-July, before the type also undergoes tropical testing in Djibouti.

As the UK continues to debate bringing a maritime patrol aircraft capability back into operation, two examples of the P-1 will be deployed for the 17-19 July event at RAF Fairford in Gloucestershire.

One aircraft will participate in the daily flying display, while the other is to appear in the static line. Japan's defence ministry says the deployment will "promote mutual understanding" with British forces and other European nations.

The P-1s were due to depart Atsugi air base on 10 July. Following their appearance at the UK show, they will carry out a series of operational tests in Djibouti from 22 July, before landing back in Japan four days later.

The JMSDF – which introduced the P-1 to service in 2013 – currently has eight in use plus two testbeds, and has another two on order. It also has pending orders for 60 more, Flightglobal's



UK deployment will be followed by operational tests in Djibouti

Ascend Fleets database shows. The four-engined type will eventually replace Tokyo's Lockheed Martin P-3 Orions, 99 of which remain operational.

With a maximum range of around 4,300nm (8,000km) and with a basic operating weight of 80t, the Ishikawajima-Harima Heavy Industries F7-10-engined P-1 is 38m (125ft) long and has a wingspan of 35.4m. Mission equipment includes a Toshiba HPS-106 active electronically scanned array radar.

No export orders have yet been secured for the maritime patrol and anti-submarine warfare aircraft, but its European debut could help to increase overseas interest in the type.

The UK retired its last BAE Systems Nimrod MR2s in 2010, and later the same year cancelled the replacement Nimrod MRA4 during its Strategic Defence and Security Review (SDSR).

A subsequent increase in Russian military activity is among factors that appear likely to put the subject of the UK's lapsed maritime patrol provision among the topics of its pending new SDSR – the results of which are expected to be released during October.

Likely contenders for any requirement include the Airbus Defence & Space C295, Boeing 737-derived P-8 Poseidon, refurbished Lockheed Martin C-130Js and potentially also the P-1. ■

COLLABORATION
GREG WALDRON SINGAPORE

Joint venture to pursue Indian rotorcraft deals

Airbus Helicopters is set to team with the Mahindra Group for future Indian military rotorcraft tenders.

The companies say they are in talks to form a joint venture that will submit bids in response to pending requirements – including a reconnaissance and surveillance helicopter, naval utility helicopter and naval multirole helicopter.

"We will have a mutually rewarding association that will offer immense benefits to India"

GUILLAUME FAURY
Chief executive, Airbus Helicopters

"We have an unparalleled track record of successful industrial collaborations with local partners across the world," says Airbus Helicopters chief executive Guillaume Faury. "With Mahindra we will have a mutually rewarding association that will offer immense benefits to India. [The venture] will supply the Indian armed forces with 'Made-in-India' helicopters of high reliability, quality and safety."

Mahindra Defence already produces armoured vehicles, undersea warfare equipment and sensors for the Indian military. ■

MILESTONE

US Navy's Prowler makes final flight into retirement

The US Navy's last Northrop Grumman EA-6B Prowler electronic warfare aircraft made its final flight from NAS Whidbey Island in Washington on 27 June, ending 44 years with the service.

The carrier-based aircraft took part in a ceremonial final take-off and flyaway from its previous home base, leading the way for the Boeing EA-18G Growler to take over as its replacement.

The aircraft – tail number 163890 – was the USN's last Prowler, and had been one of a final 14 that were retained in its inventory prior to retirement.

The USN received a total of 173 Prowlers since the type became operational in 1971, Flightglobal's Ascend Fleets database shows. The variant was derived from Grumman's A-6 Intruder strike aircraft.

While the navy has retired the Prowler, the US Marine Corps – which has operated the type since 1977 – will fly its 25-strong fleet from MCAS Cherry Point in North Carolina until 2019.

Ascend shows that the USN has received 107 F/A-18F-derived Growlers to date – including two test aircraft – and has a further 28 examples on order, with options for three more. ■



The type began service in 1971



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SF50 set for parachute test
BUSINESS AVIATION P19

CONVERSION GREG WALDRON SINGAPORE

Australia goes to Qantas for KC-30As

Canberra identifies pair of in-service Airbus A330-200s that will be converted to MRTTs for the Royal Australian Air Force

Qantas Airways will return a pair of Airbus A330-200s to CIT Aerospace by the end of the year, pending their conversion to multi-role tanker transports (MRTT) for the Royal Australian Air Force (RAAF).

Australia's Department of Defence has identified the two airliners as bearing the registrations VH-EBH (MSN 892) and VH-EBI (MSN 898). These are to be converted to its air force's KC-30A configuration at Airbus Defence & Space's Getafe site near Madrid, Spain and delivered for military use during 2018.

The DoD says it will assume ownership of the aircraft under a fleet expansion deal valued at A\$408 million (\$314 million).

Qantas says VH-EBH has already stopped flying and will be returned to CIT on 21 July. The second aircraft will cease operat-



Commonwealth of Australia

New equipment to be installed will include a refuelling boom

ing in September and be returned to the lessor on 20 November. The pair were handed over to Qantas in January and February 2008, respectively. Flightglobal's Ascend Fleets database shows that the A330s are powered by the same General Electric CF6 engines as the RAAF's existing five KC-30As.

Airbus says this is the first incidence of in-service A330-200s being converted to the MRTT standard. Under-wing hose and drogue refuelling pods, a refuelling boom and other military equipment will be installed. Each aircraft is expected to take 10 to 12 months to modify.

"The RAAF wished to use basic airframes of a specification very close to their existing fleet"

AIRBUS

"The two extra aircraft for the RAAF were exceptional due to their wish to use basic airframes of a specification very close to their existing fleet, and these two Qantas airframes were available," the company says.

"There is no proposal to convert used aircraft for any other customer," it adds.

Ascend's data reveals that the two Qantas-operated airliners had each accumulated approximately 29,000 flight hours by the end of April. ■

ROTORCRAFT DOMINIC PERRY LONDON

Moscow floats revival for Mil's amphibious Mi-14

Russian Helicopters is reevaluating restarting the assembly of the Mil Mi-14 amphibious helicopter – a type which has been out of production for 30 years.

Based on the 13t Mi-8 platform, the variant gains a sealed, streamlined hull and side-float-containing sponsons, along with a number of other modifications to make it suitable for operating on water.

The type was manufactured between 1973 and 1986.

A modernised version of the twin-engined rotorcraft could be

sold to both military and civilian operators, Russian Helicopters believes. However, it says it will wait for customer demand to

materialise before recommencing production.

Flightglobal's Ascend Fleets database records 44 Mi-14s as



Russian Helicopters

The Russian rotorcraft has been out of production for 30 years

currently in active service, with the model operated by the naval air arms of Congo, Pakistan, Poland and Ukraine, the Georgian land forces and the air forces of Libya, North Korea, Syria and Yemen.

The type is employed for duties ranging from anti-submarine warfare to search and rescue and utility transport tasks.

Ascend also records a single civilian example, configured for utility and fire-fighting missions, as being in storage with the United Arab Emirates-based AAL Group. ■

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DEVELOPMENT ARIE EGOZI TEL AVIV

IAI evaluating 'revolutionary' light designs

Israel Aerospace Industries is evaluating a number of designs for its light business jet and plans to present the shortlisted concepts to potential funding partners by the end of the year.

But the company is keeping details of the project under wraps for the time being.

IAI chairman Rafi Maor recently revealed that a light jet "is still being evaluated by the company and [its design] is based on a revolutionary approach".

Last year, *Flight International* learned that IAI had become involved in an effort to develop a six-seat executive jet that will offer low-cost travel at ranges of up to 1,300nm (2,400km). Since then, it has been working with potential partners.

IAI is already an established player in the traditional business jet market, manufacturing the G150 and G280 business jets for Gulfstream from its Tel Aviv base. However, this latest project is another attempt by the company to introduce a unique product into the sector, and is undeterred by its previously unsuccessful forays into this field.

The company is keeping details of the project under wraps for the time being

IAI's first venture came in the late 1990s when it signed a co-operation agreement with US start-up Avocet to co-develop the six-seat Projekt short take-off and landing aircraft. The project was cancelled in 2006, after Avocet failed to secure other partner to help complete development.

A year earlier, IAI had established a strategic partnership with Colorado-based start-up Aviation Technology Group to produce the Javelin personal jet. However, the project was cancelled two years later due to a lack of funding. ■

UPGRADE KATE SARSFIELD LONDON

South African King Air returned to duty

ExecuJet Aviation has delivered the first refurbished Beechcraft King Air B200 for the South African Air Force.

The business aviation services company was awarded a contract in August 2014 to upgrade the service's fleet of four twin-engined turboprops, which are used for personnel transportation and medical evacuation.

"This [first] B200... has undergone extensive work," says ExecuJet vice-president for Africa Ettore Poggi. This included the installation of a new interior, repainting of the exterior and a major maintenance inspection. ■



The upgrade work was undertaken at ExecuJet's Lanseria facility

BRANDING KATE SARSFIELD LONDON

Le Mans winner signs up for GlobeAir point-to-point push

Nico Hülkenberg will help the company to meet ambitions around European taxi services

GlobeAir – Europe's largest Cessna Citation Mustang operator – has appointed Formula One racing driver Nico Hülkenberg as its brand ambassador.

This selection of the Le Mans 24h race winner is designed to raise the profile of the Austrian charter company across the continent, expand its customer base and eventually enable GlobeAir to fulfil its long-held ambition to provide a point-to-point, low-cost, pan-European air taxi service.

"Hülkenberg was already a GlobeAir customer," says company founder and chief executive Bernhard Fragner. "So it was a natural step to appoint him to promote our brand and our service to other travellers who are looking for convenient and flexible transportation around Europe."

GlobeAir operates a dozen Mustangs and is scheduled to take delivery of another of the entry-level jets before the end of September. "That will be our third Mustang this year," Fragner says. "We are now looking on the pre-owned market with a view to adding more aircraft to sat-



Hülkenberg: Ambassador role

isfy the growing demand [for small business jet charter]," he adds.

The eight-year-old company is one of the early adopters of commercially-operated Mustangs in Europe and one of three companies on the continent providing charter services with the six-seat twin. UK-based Blink and France's Wijet complete the line-up.

"I am as convinced today by the point-to-point, pan-European air taxi model as I was when I started," says Fragner.

GlobeAir planned to launch a service in 2008, but the collapse of the financial markets later that year put its expansion on hold.

"These entry-level jets offer so

much convenience and flexibility for travellers at a cost that is comparable with a business class airline ticket," Fragner explains. "We have already proven that there is demand out there for this type of service. It is just a matter now of spreading the word and building our customer base."

Fragner says a minimum of 20 aircraft are needed to make the service viable. To expedite this goal, GlobeAir is hoping to form a strategic partnership with UK-headquartered Blink, which is owner of nine Mustangs and a strong advocate of the pan-European air taxi model. "Our company cultures and outlooks are very similar. We are talking to each other now to find a way to make this work," says Fragner.

GlobeAir is also looking to add a larger and longer-range aircraft to its fleet early next year.

"We have narrowed our choice to the [Embraer] Phenom 300 as it will connect all the most popular city pairs within Europe – such as London to Nice – and can seat more people than the Mustang," Fragner says. ■



Runway troubles
continue despite
Heathrow backing
NEWS FOCUS P20

PERSONAL JETS KATE SARSFIELD LONDON

SF50 set for parachute test

Cirrus will trial CAPS system on a prototype as the first production aircraft nears completion

Cirrus is readying its Vision SF50 prototype for emergency parachute system testing – the last major certification milestone for the single-engined personal jet, which remains on target for service entry at the end of the year.

“We completed ultimate load testing last month,” says SF50 product line manager Matthew Bergwall. “This enabled us to verify the strength of the aircraft’s canopy.”

The bespoke Cirrus Airframe Parachute System (CAPS) is now being fitted inside the nose of the second flight-test aircraft, C-1. This will be the flying testbed for the system, although all three SF50 prototypes will eventually have it installed.

“The CAPS is an integral part of the SF50,” says Bergwall. This feature – which is standard on all Cirrus types – is designed to lower the aircraft safely to the ground after a loss of control, structural failure or mid-air collision. Cirrus says the CAPS has helped to save more than 100 lives since its introduction.

“The team has spent a great deal of time developing the system for the SF50,” Bergwall adds. “In-flight deployment tests will ensure that everything is in full working order.”



Aircraft C-1 will be the flying testbed for the recovery system

The three Williams International FJ33-powered prototypes have accumulated 600h to date and Cirrus says the programme is on target to receive US certification in the fourth quarter.

The first SF50, designated C-0, rolled out in March last year and has notched up 400 flying hours during aerodynamics, performance and stability testing. C-1 joined the programme in November and has undergone 120h of natural ice testing. C-2 – the final flying prototype – has flown around 100h since arriving in December.

Construction of the first production SF50, designated P1, is almost complete, and the aircraft

will join the flight-test programme early in the fourth quarter. It will be used for function and reliability testing, according to Bergwall.

“There are three production aircraft in various stages of assembly,” says Bergwall. “We plan to deliver a small number this year, building up to around 70 in 2016 and 100-plus the following year.”

Cirrus has a backlog of 550 orders for the \$1.96 million Garmin G3000-equipped aircraft, mainly from current SR20/22 owners. It expects special mission, commercial and corporate operators to eventually account for a sizeable share of the orderbook. ■

DISPLAY KATE SARSFIELD LONDON

Piper prepares M600 mock-up for show debut

Piper Aircraft’s M600 single-engined turboprop will make its show debut later this month at the AirVenture business and general aviation event in Oshkosh, Wisconsin.

The seven-seat aircraft was launched in April and sits at the head of Piper’s nine-strong family of propeller-driven aircraft, most of which will be on display alongside the M600 mock-up.

The M600 is based on Piper’s M500 turboprop-single platform, but has a redesigned wing and digital fuel management technologies.

The Pratt & Whitney Canada PT6A-42A-powered M600 is priced at \$2.8 million and is scheduled for certification and service entry in the fourth quarter of this year. ■



M600 will have a maximum range of 1,300nm (2,405km)

SALE KATE SARSFIELD LONDON

Fly Alpha becomes Axtmann’s latest acquisition

Axtmann Holding – parent company of German business aircraft services provider FAI rent-a-jet and maintenance company FAI Technik – has purchased a majority stake in fellow Nuremberg-based operator Fly Alpha.

The acquisition comes as Axtmann takes full ownership of FAI rent-a-jet following the exit of its Greek partner MIG Aviation Holdings.

“Due to the economic crisis in Greece, MIG needed to secure

some liquidity,” says Axtmann founder and chairman Siegfried Axtmann. “We bought their stake for just over €25 million. Now we have full control of the company and our plan is to continue to expand through organic growth and acquisitions of strategically important ventures, such as Fly Alpha.”

The latter’s Beechcraft Premier 1A entry-level business jet and King Air 200 and 350 twin-engined turboprops fill a niche in

the FAI line-up for short-haul charter and air ambulance services, says Axtmann.

The company has initially acquired a 51% stake in Fly Alpha, but has an option to complete a full purchase at a later date. “We have noticed that there is a lot of opportunity in Europe for the shorter two-hour charter flights which we were not tapping into,” says Axtmann. “Our fleet is more suited to longer-range flights, so it made sense to add in

smaller aircraft to maximise use of our resources.”

The sale comes at a time of increasing consolidation in the European charter market. Recent deals include Switzerland’s ExecuJet being purchased by Luxaviation – a prolific buyer, having snapped up six companies since 2013.

“We are looking at two more acquisitions that would complement our special missions and management businesses,” says Axtmann. ■



AIRPORTS OLIVER CLARK & MURDO MORRISON LONDON

Runway troubles continue despite Heathrow backing

No end in sight for UK capacity argument as analysis shows how main hub is losing out

In his first speech following the UK Airports Commission's recommendations of a third runway at London Heathrow, the airport's chief executive John Holland-

Kaye described the debate over where the new runway should be built as "now firmly closed". But after years of political battling and false dawns in the London

airports debate, and with rival London Gatwick insisting it is still in with a chance, that would appear to be wishful thinking.

NOT OVER

Such has been the saga around airport expansion in the UK – and in London in particular – that even with "clear and unanimous" backing for expansion at Heathrow from a commission which has spent two-and-a-half years studying the issue, Gatwick isn't giving up. "It is for the commission to make a recommendation, but it is of course for the government to decide. So we now enter the most important stage of the process," says Gatwick boss Stewart Wingate.

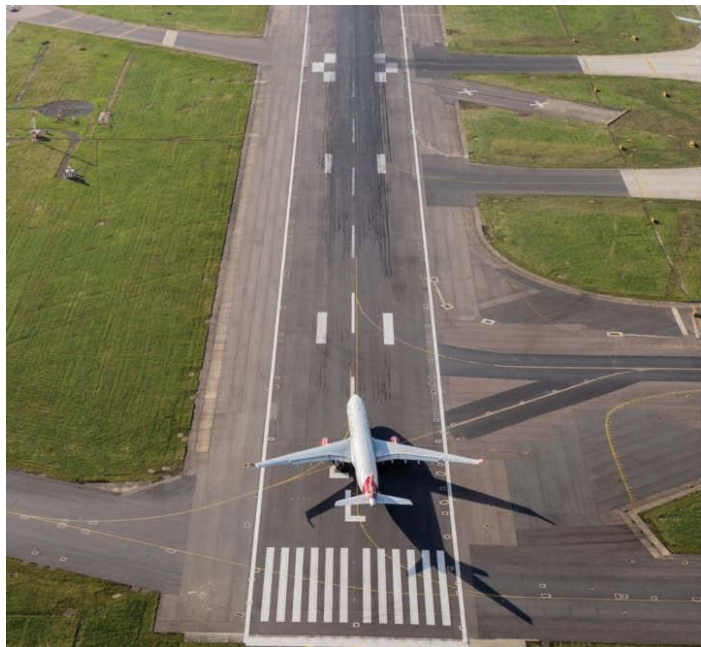
"We are confident that when the government makes that decision they will choose Gatwick as the only deliverable option. It is quicker, simpler and quieter. Above all – after decades of delay – it can actually happen."

Understandably, Holland-Kaye and Heathrow are making

much of the report and its "clear recommendation" for Heathrow.

While commission chairman Howard Davies describes the other shortlisted options – which also included extending the existing runway at Heathrow – as feasible, he says its conclusions are clear and unanimous: "The best answer is to expand Heathrow's capacity through a new north-west runway."

But it says much for the wide-



Other options include extending the existing Heathrow runway

ANALYSIS

European and Gulf rivals soar as constraints strangle destination growth

An analysis of Flightglobal's Innovata airline schedules data by Henk Ombelet from Flightglobal's Ascend consultancy team reveals some of the ways Heathrow's business has been impacted by its capacity constraints.

ROUTES

Heathrow has a lower number of destinations, at around 160, than any of its European competitors, as well as Dubai International, which is at the vanguard of the new Middle Eastern hubs competing with European airports for long-haul traffic between East and West. Both Dubai and London Gatwick have vaulted over Heathrow in the past 10 years, while Amsterdam, Paris Charles de Gaulle and Frankfurt have remained consistently ahead, with each today serving between 250

and 300 cities. During that time, Heathrow's routes have fallen slightly.

However, frequencies are typically lower at other airports. Airlines operating from Heathrow will tend to increase frequencies on established routes before trying out new routes with low frequencies. This means Heathrow could be missing out on many emerging destinations.

Because of its reliance on long-haul, particularly the trans-Atlantic market, Heathrow's European destinations lag far behind other major European airports, but even Dubai is catching up in terms of European cities served. Heathrow tends to swap European services for long-haul, as seen by the recent slot sale by SAS (operating a European service) to American Airlines.

Heathrow's long-haul destinations have also fallen over the past 10 years, from over 100 to around 95. This is despite the move of several US

"Because of its reliance on long-haul, Heathrow's European destinations lag behind other airports"

services from London Gatwick to Heathrow. While Charles de Gaulle and Frankfurt have seen long-haul destinations rise to almost 140, the big winner has been Dubai, which has seen long-haul services soar from under 100 in 2004 to over 180 today.

AIRCRAFT SIZE

While average aircraft size has been rising at all Heathrow's competitors, it remains much higher at the London hub, at just over 200 seats. The figure is between 160 and 180 at Amsterdam, Frankfurt, Charles de Gaulle and Gatwick, smaller than the average aircraft operating from Heathrow a decade ago, which was just below 200 seats. The gap between Heathrow and its rivals can partly be explained by the London airport's larger proportion of long-haul flights. However, even just for European flights, the average Heathrow airliner is still bigger.

SEAT CAPACITY

Mainly as a result of the larger aircraft sizes, overall seat capacity at



Lofty ambitions

FEATURE P24



The commission recommends placing a third runway further west, to reduce the impact of noise

Rev Features

spread cynicism surrounding development of airport capacity in Europe in general, and London in particular, that there is room for more twists yet. After all, a Labour government reaffirmed plans for a third runway in 2009, only for them to be scrapped 18 months later when a Conservative-Liberal Democrat coalition took power.

The commission argues its recommendation “is a fundamentally different proposition from pre-

vious proposals to expand at Heathrow.

“It delivers a full-length runway, maximising the connectivity gain. It is situated further west than the current runways, which will help to reduce the number of people affected by noise. And it is accompanied by strong measures to limit the impacts on those living nearby.”

A third runway could be operational at Heathrow airport as

soon as 2026 “if the [UK] government gets on with it and makes a decision”, Davies believes. The UK government is studying the report and transport secretary Patrick McLoughlin says he will provide “clear

“We are confident that when the government decides, they will choose Gatwick as the only deliverable option”

STEWART WINGATE

Chief executive, Gatwick airport

direction on the government’s plans” in the autumn.

But even should a rapid decision be made, timelines have already slipped – a third runway at Heathrow was originally earmarked for the 2015-20 time-frame – and the UK’s biggest airport has been losing ground to other big hubs, in Europe and the Gulf (*see story below*).

Peter Morris, chief economist with Flightglobal’s Ascend consultancy, contends that Heathrow’s lack of ability to expand “leads to all sorts of inefficiencies, including price and delays” and that for as long as it

does not have additional runway capacity, it will “become a more expensive airport”.

Current and projected demand for slots means “you could justify two more runways at Heathrow without a shadow of a doubt. An awful lot of demand is being suppressed. Where does that demand go? To other UK airports maybe. Certainly to other European airports. Or people just don’t fly.”

BIG ISSUES

Heathrow’s biggest challenge, he says, is that managing limited capacity – by pushing for a higher mix of large-capacity, long-haul destinations at the expense of European and other feeder routes – ignores the fact that transferring passengers currently make up around a third of travellers at Heathrow: “Remember, if you just have long-haul routes, Heathrow doesn’t work.”

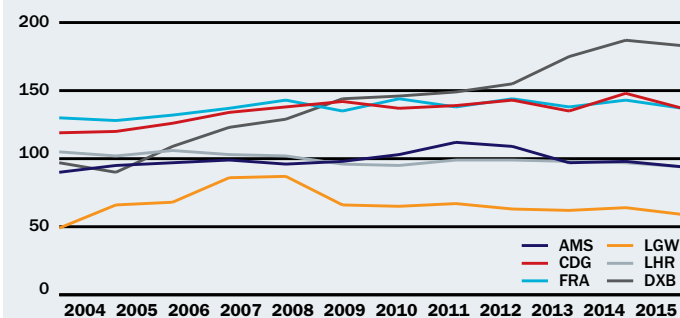
Having several other London airports, including Gatwick, Stansted, Luton and City, focused on European routes and soaking up some of the demand may not be a strength for the UK capital, says Morris.

“In fact, you could say it’s the most inefficient airport system in the world,” he adds. ■

Additional reporting by Graham Dunn, London

LONG-HAUL DESTINATIONS

Number of destinations



SOURCE: Innovata – part of Flightglobal

Heathrow has grown slightly. However, although it remains around a quarter higher than its closest European competitors, Paris and Frankfurt, these airports, as well as Gatwick and Amsterdam, have grown their seat capacity faster. Dubai has more than trebled its seat

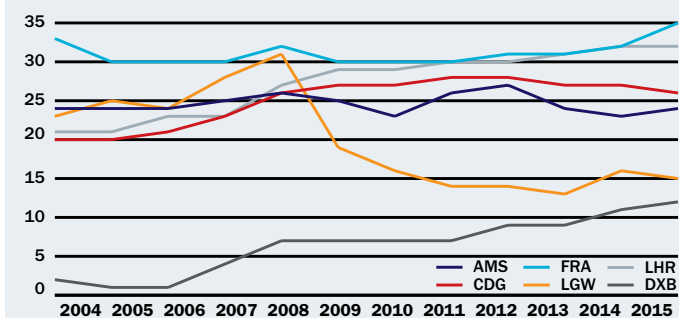
capacity in 10 years and in the past two years overtaken Heathrow.

NORTH ATLANTIC

This remains Heathrow’s strength, with more than twice as much seat capacity to the Americas as Charles de Gaulle or Frankfurt. This is driven

NORTH ATLANTIC DESTINATIONS

Number of destinations



SOURCE: Innovata – part of Flightglobal

mostly by frequency. Frankfurt, for instance, has six or seven flights a day to New York, while there are 28 from Heathrow. North American destinations have increased by around 50% since 2004 to 32, partly as a result of the transfer of services from Gatwick.

NUMBER OF FLIGHTS

This has remained constant at Heathrow for the past 10 years as the airport is at capacity. Paris has seen a reduction since 2008 as the French economy weakened. Gatwick has also seen an increase in flights with the growth of low-cost carriers. ■

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LOFTY AMBITIONS

Visitors to EAA AirVenture will be the first to glimpse Perlan 2, a glider that aims to take sustained flight to more than 90,000ft and the edge of space

HOWARD SLUTSKEN VANCOUVER

Making its debut at EAA AirVenture 2015 is a new aircraft that is destined to shatter records. The Airbus-branded Perlan Mission II will use a little-known meteorological phenomenon called the Stratospheric Polar Night Jet to reach and fly at 90,000ft – piloted, winged and sustained flight at over 27,400m.

Perlan 2 will fly higher than the Lockheed U-2 or SR-71, but it is not an exotically-shaped or scramjet-powered superplane. It is a glider.

The idea for the record flight attempt – expected to be staged next summer in Argentina – goes back 60 years, to when a young gliding instructor called Einar Enevoldson volunteered as line-crew in the US Air Force-funded Sierra Wave Project, in Bishop, California.

Back then, the mountain wave weather phenomenon was little understood, and two Pratt-Read PR-G1 gliders were flown into the wave to gather meteorological and observational data, reaching altitudes as high as 44,255ft.

When strong winds cross a mountain range, the effect can be the same as a river cur-

rent flowing over rocks: the air gets pushed into an invisible wave behind the range. Unique, lens-shaped lenticular clouds are formed. The air inside the wave is smooth but surrounding air can be violently turbulent.

Now an 83-year-old USAF and NASA flight test veteran, Enevoldson is leading a team of test pilots, programme managers and meteorologists in an attempt to achieve the first unpowered flight to over 90,000ft.

“You could see in the highest waves, it seemed that there was some major motion going on in the atmosphere at very high



Perlan 2 will exploit mountain wave winds in a bid to reach a record 90,000ft

altitude. Something was impinging on top of the wave field," says Enevoldson.

After a long and varied career as a USAF fighter and test-pilot at the NASA Flight Research Center at Edwards AFB in California, Enevoldson joined Grob Aircraft in Germany.

RESEARCH

In 1988, he was the test pilot for Grob's G-520 Egrett, an early "SigInt" aircraft capable of flying at 50,000ft for 8h. He also flew the Grob Strato 2C, a prototype high-altitude research aircraft.

Still focused on high-altitude flight, in the early 1990s Enevoldson saw a LIDAR image taken from an aircraft flying along the Arctic Circle. "It clearly showed the wave nature of the clouds at 80,000ft," he says. "So I said that we should build a pressurised glider and fly up to 80,000ft. I began looking for funding for the project, and eventually met Steve Fossett.

"After a serious negotiation lasting about 10 seconds, we decided to do it," he laughs. With Fossett's support, Enevoldson founded the Perlan Project, Inc, a not-for-profit aero-

nautical exploration and atmospheric scientific research organisation.

Rather than starting with a pressurised design, the Perlan 1 was a modified DG Flugzeugbau DG-505m glider. Double-glass canopies were installed to eliminate frost-over, along with a NASA high-altitude oxygen system and other mission-specific equipment. Enevoldson and Fossett wore pressure suits borrowed from NASA Dryden, and the team went to New Zealand for three seasons.

Although data suggested that the best and strongest waves were there, Perlan 1 only reached 30,000ft.

"I began looking for funding for the project, and eventually met Steve Fossett"

EINAR ENEVOLDSON

Perlan

"Steve wanted this to happen, and never gave up," says Enevoldson. "We had no data from South America, but we looked at a map and saw El Calafate, in Patagonia, Argentina, at 50° south. The first year, we went there too late, but on the first flight of the second year [29 August 2006], we flew right into the primary wave, and went up to 34,000ft, climbing at 2,000ft/min."

But as the glider climbed through 36,000ft, the pilots' pressure suits became progressively stiffer, and they found it increasingly difficult to manipulate the controls and equipment. "This was as expected, but more troublesome than we had hoped," he says.

"We were cold and tired," he says. "We were actually at 51,500ft, and we knew our altimeters were accurate." After the 5h flight, the data recorders were sent off for verification. However, a calculation error reduced the record-setting altitude to 50,671ft.

The Perlan team recognised that a pressurised glider would be needed to reach higher altitudes. Some thought was given to "beefing up" an Alexander Schleicher ASH-25 glider, but the decision was made to create the Perlan 2, a purpose-built pressurised glider. The Perlan 1 was eventually donated to Seattle's Museum of Flight, where it is on display.

Tragically, in September 2007, Steve Fossett was killed while flying in the Sierra Nevada mountains in California. And although the design and construction of Perlan 2 continued, funding began to dry up. Looking for new partners, the project team met with Airbus in early 2014. Ken McKenzie, deputy chairman and senior vice-president for strategy and corporate development for US-based Airbus Group Inc, and a glider pilot himself, was in the initial meeting.

» “Before the meeting, I said ‘you can’t fly a glider to 90,000ft,’” recalls McKenzie. “When we finished the meeting we said, ‘how much do you need?’ We were so enthralled with the vision they had, and what they had accomplished so far, that we had to be a part of this.”

At EAA AirVenture 2014, the project officially became the Airbus Perlan Mission II. “For us, one of the key tenets of this project is the exploration and excitement of doing something that’s never been done before,” says McKenzie. Within the company, the mission is part of Airbus Group Innovations, with McKenzie overseeing Airbus’ involvement.

With funding in place to ensure the construction of Perlan 2, the glider’s components were taken out of storage and moved to RDD Enterprises in Redmond, Oregon, where assembly was completed in June.

PRESSURISED

Perlan 2 is constructed almost entirely of carbonfibre, primarily using pre-impregnated carbon sheeting and tapes. The glider has a 25.6m (84ft) wing made up of four custom airfoil sections, with an aspect ratio of 27. The airframe is designed to handle +6/-4g loads. With an empty weight of 574kg (1,260lb), the gross weight will be approximately 816kg with two pilots and full mission equipment on board. The cabin is a sealed compartment and will be pressurised to 8.5psi, giving a maximum in-cabin altitude of 14,000ft.

“I decided a conventional [glider] canopy wouldn’t work for a pressurised cabin,” says Enevoldson. “I had a pretty good idea of what the cabin should look like.” Perlan 2’s cabin has plug doors and rounded windows, set in a configuration that has been successfully flight-tested by masking the canopy of conventional gliders to match the new aircraft’s design.

“A lot of people compare our cabin design to SpaceShipOne,” says Morgan Sandercock, project manager and pilot. “A couple of years

WAVE SCIENCE

HOW CAN A GLIDER CLIMB TO THE EDGE OF SPACE?

IT ALL starts with the winter weather in Antarctica.

Glider pilots around the world regularly climb to altitudes above 20,000ft, or even 30,000ft, flying in the strong lift found in mountain wave conditions. But for Perlan 2 to reach 90,000ft, the pilots will need to jump into an express elevator in the Andes, romantically named the Stratospheric Polar Night Jet.

“The polar vortex comes alive in Antarctica in the winter due to the tremendous cooling at the poles, the sinking of the air, and the rotation of the globe,” explains Dr Elizabeth Austin, atmospheric physicist and the founder and president of Nevada-based WeatherExtreme Ltd. She joined the Perlan Project in 1998 as chief meteorologist, and developed the weather models used in both the Perlan 1 flights and the upcoming Perlan 2 missions to El Calafate next year.

“You get these sharp temperature contrasts, and with the globe rotating, the jet starts to form,” says Austin. “It circles the pole, and gets these kinds of tails that scoop away from it, and it wiggles and wobbles. Sometimes it pulls away and become this tight jet, and sometimes it spreads out.” The polar night jet starts

around 30,000ft in the mid-to upper-tropopause, and climbs well into the stratosphere, as high as 130,000ft to 140,000ft. The core winds of the night jet can reach an astonishing 260kt.

A number of meteorological factors will have to line up in order to provide the optimal conditions for Perlan 2’s flights, according to Austin. Prefrontal conditions have to occur during the relatively short, winter daylight flying time, and the polar vortex and night jet have to be very active and over Argentina. The lower level jet and resulting wave have to line up just beside, but not under the night jet, and the orientation of both, relative to the Andes mountain range, is important.

Perlan 2’s pilots will climb in the lower level wave before penetrating the lift generated by the night jet. If the polar vortex and the low level jet stream are not properly aligned, the pilots will likely have to transition through an area of weak climb around 50,000ft. But if the conditions are exceptional, then the horizontal and vertical wind speeds in the night jet will increase with altitude. “There’s also a zone where we may experience ‘breaking waves,’” says Austin. “As the waves get



Mountain waves form distinctive lens-shaped clouds, seen here over the Sierra Nevada

higher and higher, they actually bend windward, and if they get steep enough, they will break. It creates extreme turbulence, and could tear an aircraft apart.”

Getting accurate, timely data to feed the weather model will be a challenge, says Austin. “The closest [balloon] sounding is about 300 miles northeast of El Calafate, and

ago at Oshkosh, I got the chance to shake Burt Rutan’s hand. He said, ‘you’re using the same materials to solve the same problems, so of course it looks the same!’”

Inside Perlan 2’s cabin, the pilots will use a closed-loop rebreather system adapted from existing underwater breathing technology, with each pilot on an independent system. The system feeds 100% oxygen, and will scrub carbon dioxide and moisture from the pilots’ exhalations. A second tank, containing ordinary compressed air, will feed “make-up” air into the cabin, dealing with expected leakage and preventing the oxygen content of the cabin air from exceeding 26%.

The closed-loop system is very efficient, says Sandercock. “Using the rebreather function the pilots can breathe for 8h. But if there’s

a failure and we have to go to an open-loop mode, we’ve got 20min in the system for an emergency descent.” In open-loop, the pilots will breathe directly from the oxygen tank, bypassing the rebreather system.

The pilots will use a custom-designed life support system display to monitor and control the glider’s pressurisation and breathing systems, and an LX Avionics LX-9000 vario-navigation system will be the primary flight and information display. Perlan 2 will not be equipped with an autopilot, but a yaw damper will be fitted. The scientific instrument package will be mounted aft of the pressurised cabin, utilising a CubeSat frame.

When meteorological data recommends a launch (see panel above), the mission profile will see Perlan 2 towed about 100km from El



Enevoldson (left), Fossett and Perlan 1

Airbus Perlan Mission II


Airbus Perlan Mission II

the next closest is 600 miles north. A bunch of them are launched on the Antarctic continent, but those are inside the vortex. We're hopefully going to launch our own soundings from upwind, which will transition through the atmosphere we're going to be flying in." All of the weather data will be fed into modeling software called the Weather Research and

Forecasting System, which will forecast conditions out for 48h at very high resolution. "We're going to be watching it, not just to guide us when to launch, but where to tow," she adds.

Austin says that the science generated by the Perlan 2 missions will increase knowledge of our climate. "We're going to be studying ozone, because we're on the edge of the ozone

hole. We're going to learn about the structure of the stratospheric mountain waves and the breaking waves. We'll learn how breaking waves impact energy, and transfer heat and chemicals to and from the troposphere. That's an important part of improving climate models, because [current] climate models don't take breaking waves into consideration." ■

Calafate, with a release altitude of around 10,000ft, says Jim Payne, chief pilot. Payne, also an ex-USAF fighter and test-pilot, thinks nothing of spending a day in a Schempp-Hirth Arcus glider, and flying a record-setting 972nm (1,800km) by running up and down the Sierras from Minden, Nevada.

TROPOPAUSE

"We expect the roll response to be slow at low altitude; any glider with that span is sluggish," says Payne. Perlan 2's wing is designed to be most efficient in the 50,000ft range, with a 200ft/min minimum sink rate, reflecting data that shows the weakest climb will be in that altitude region, just above the tropopause.

Once the glider penetrates the wave, there are two basic flying strategies. If the opposing

wind speed is less than the glider's best-performance speed, the pilots will crab back and forth to stay in the best climb region. But if the pilots can match the wind speed, "you park there and go up like an elevator", Payne says.

Stall speed of Perlan 2 is predicted to be 33KIAS at 90,000ft, with its never-exceed speed at 56KIAS. "We'll figure out the minimum sink speed, and then we'll know what to fly. I won't be surprised if we spend a lot of time at 36-38KIAS," says Payne.

Although the indicated airspeeds are low, the true airspeeds will add to Perlan 2's records. That 36KIAS is equivalent to 242kt (447km/h), true airspeed. The opposing wind speed is expected to be above 200kt, so "as we get high, we'd better be pointed west", chuckles Payne.

Sandercock agrees: "It's about 1,000km from El Calafate to Port Stanley in the Falkland Islands. Downwind, we could do that in a couple of hours."

Payne, Enevoldson, Sandercock and Perlan 2's other pilots will fly in the aircraft's pressurised cabin dressed as they do for lower-altitude wave flights: in ski clothing, with down boots and electrically-heated socks. The cabin's carbonfibre-sandwich construction may

"If you can match the wind speed you park there and go up like an elevator"

JIM PAYNE

Chief pilot

provide good insulation against the expected -57°C (-70°F) outside air temperature, says Payne. "The human body is like a 100W light bulb, and with the avionics in the cabin there's actually a chance we might have a problem with too much heat in the cabin."

If an emergency descent from 90,000ft is ever required, Perlan 2 is equipped with a drogue parachute that has two separate activation circuits. Payne explains: "It's sized so that we can come straight down at 80KIAS – 80 indicated at 90,000ft is pretty damn fast; a lot of sink rate!" In the case of a catastrophic airframe failure, the aircraft is also equipped with a ballistic parachute that is designed to be deployed at 10,000ft.

Perlan 2 will be on display at AirVenture, and will head back to Oregon for initial flight testing in August. Payne will make the first flights, and once the glider's basic performance is determined, it will be fitted out with the pressurisation and other mission-related systems. The base will shift to Minden in January 2016, to flight test all of the glider's systems, and also to prepare ground crews and pilots. ➤


Airbus Perlan Mission II

The cabin is pressurised to 8.5psi






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Senior VP Flight Operations
AirBaltic
-  **Mike Anderson**
Senior Director of Safety
Spirit Airlines
-  **Martin Timmons**, Deputy Director of Safety & Security / Safety Manager,
Ryanair
-  **Gerhard Coetzee**, Senior Vice President Corporate Safety and Quality Assurance,
Air Astana
-  **Robin Zammit**
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


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
Park Inn by Radisson, London Heathrow, UK, 15th – 16th September 2015

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
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» The team will move to El Calafate in June 2016. “Hopefully we’ll get to at least 40,000ft in the Sierras. But when we get to Argentina, we’re not going straight to 90,000ft,” says Payne. The incremental test programme will see Perlan 2 carefully increase altitude before going for the 90,000ft goal.

TRANSONIC

After that, Perlan 2 will continue to fly missions, between 90,000ft and 100,000ft. Once regular operations are established, scientists may fly in the back seat to operate research instrumentation. Flight at 100,000ft and above may be possible, but Perlan 2 is likely to need new, transonic wings to reach that goal.

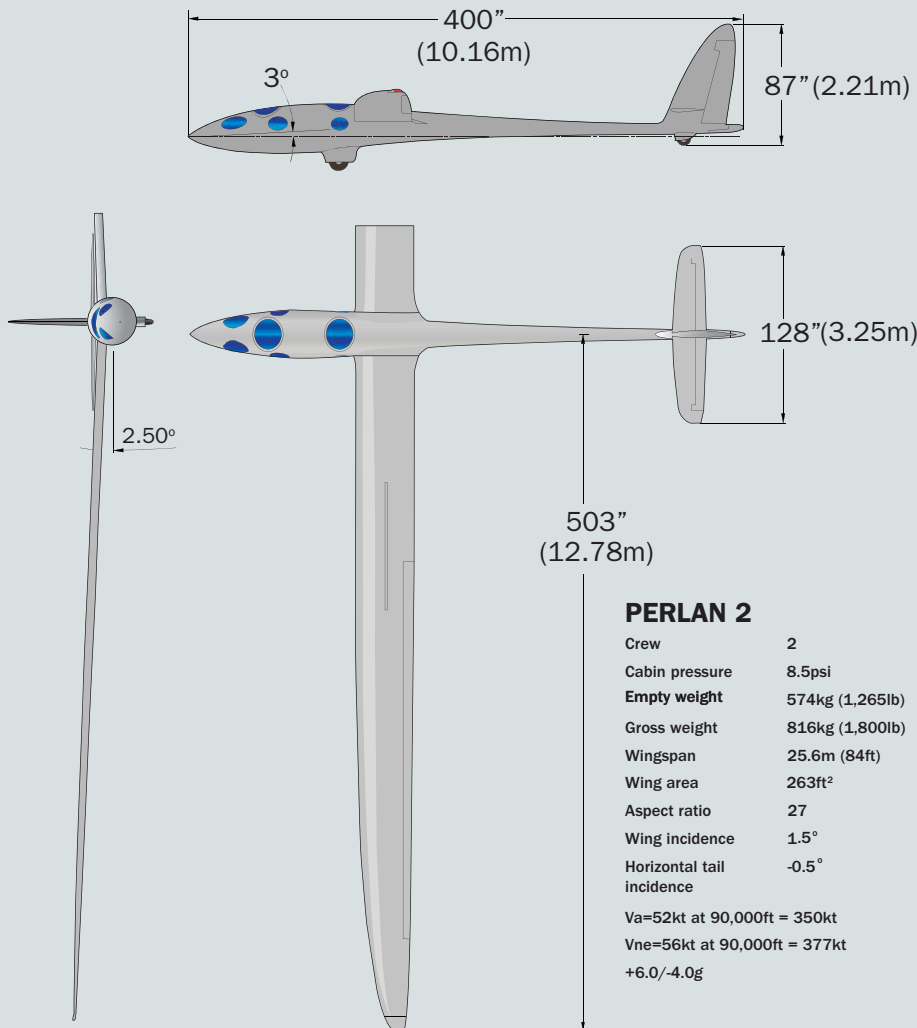
One might wonder what can be learned from flying a glider into the stratosphere. The mission’s goals are meteorological research, aeronautical exploration and aerodynamic advancement, with a strong emphasis on education to inspire future generations to pursue careers in mathematics, science and research.



Construction in Oregon will be followed by flight testing in Nevada

Airbus Perlan Mission II

PERLAN 2 DESIGN



Airbus’s McKenzie says: “Continuous flight in that realm is something that we don’t know anything about. As we look to the future, with airspace becoming more and more congested, we may have to start looking higher and higher. As well, the atmospheric parameters above 90,000ft approach those on Mars, so if we’re working on a spaceplane for a Mars mission, we can prove the concepts here. The data that is gathered will be a very useful outcome of the project. And I think Perlan 2 will strike a chord with the general public.”

“Continuous flight in this realm is something that we don’t know anything about”

KEN MCKENZIE

VP, strategy & corporate development, Airbus Group Inc

Dennis Tito has already seen 90,000ft on the altimeter, twice, during his Soyuz flights to and from the International Space Station in 2001. Tito is a major contributor and sponsor of the Perlan Project, and obtained his glider licence just a few years ago, at the age of 68.

He will be another of Perlan 2’s pilots, drawing on his 650h mountain wave gliding experience during the missions. Tito hopes that Perlan will inspire a new generation. “Everything I’ve accomplished in my career can be linked to that interest as a young person. I don’t see us having the kind of inspiration in the area of spaceflight today that we had 50 years ago. What can we do that would be new and exciting, to inspire young people? I think Perlan is one opportunity.”

“I think of this as an exploration,” Enevoldson adds. “There are parts of the earth that we haven’t explored, and I’m an explorer.” ■

CARRY ON CARAVAN

Cessna's versatile single-engined turboprop has been transporting passengers, freight, tourists and troops for 30 years. Today, with new configurations on offer, there is a focus on its value to the special missions sector



About 85% of the Caravans built this year will be EX models, powered by a PT6A-140 engine

MURDO MORRISON LONDON

Cessna's 208 Caravan has fulfilled many roles over its 30-year lifetime – from commuter airliner to feeder freighter, and from military transport to sightseeing aircraft – notching up 13 million flying hours in 100 countries along the way. Now, as the Pratt & Whitney Canada PT6A-powered single-engined utility turboprop nears its 2,500th delivery, Cessna is increasingly pushing the Caravan's qualities in the special mission arena. At June's Paris air show, parent Textron Aviation debuted the newly-

configured Grand Caravan EX demonstrator, sporting a variety of special mission features, including surveillance console and medical stretcher. It now plans to display the demonstrator at industry events around the world.

The Wichita manufacturer delivered 95 Caravans last year, with just under a fifth to be operated in a special mission role. That proportion is a "step level" increase on previous ratios, says Christi Tannahill, senior vice-president of turboprops at Textron Aviation, and is largely thanks to the efforts of Textron's special mission business, with its 78 dedicated staff. Textron's acquisition of Beechcraft last

year brought with it – along with the King Air range – Beechcraft's "very robust" special mission business, geared to deliver versions of the King Air and T-6 military trainer. Now the Caravan benefits from a special mission expertise that "goes right across our product line", says Tannahill.

RUGGED DEPENDABILITY

The merger of the two rival Wichita-based general aviation names brought together the market-leading single-engined turboprop and its equivalent in the world of twinprops, the King Air. Although both are similarly-sized and have a reputation for rugged dependability and short-runway performance, the King Air flies further and higher, carries more payload and is more than three times the price of a Grand Caravan EX. Neither does the Caravan compete with other established single-engined turboprops, such as the Pilatus PC-12

"We are seeing EXs flown on city pairs that previously have not had a service"

CHRISTI TANNAHILL

Senior vice-president of turboprops, Textron Aviation

and Daher TBM 900, which are faster, smaller, pricier and pitched mainly at the owner-flyer market. Instead, after many years of being almost in a class of its own, the Caravan is facing new competition in the form of the Quest Kodiak and Mahindra Airvan 10 single-engined turboprops, as well as the reborn Viking Twin Otter twinprop.

All these manufacturers are determined to tap into what has traditionally been the Caravan's market, for low-cost, nine- to 12-seat utility aircraft able to perform a multiplicity of roles. Since launching the Series 400 Twin Otter programme in 2007, Vancouver Island-based Viking has delivered just over 70 of the PT6A-34-powered aircraft and is building about 25 of the twinprops a year. Idaho-based Quest Aircraft has delivered around 140 of its Kodiak since it entered service in 2007, and now has the financial backing of Japanese owners to fulfil its ambition of becoming "the leading manufacturer of single-engined turboprops in the world". India's Mahindra is developing the Airvan 10, a 10-seat stretch and turboprop-powered variant of its Airvan 8 piston, originally produced by Australia's Gippsland.

Tannahill says Cessna's reaction to this new competition is to "continue to focus on what our aircraft does well", and to "speak to our customers and understand what their expectations are". Adam Blackford, business leader on the Caravan, says: "We talk about what the product can do and what it has proven over 30 years. It is very robust and versatile."



The type is used by commercial services to access remote locations; operators regularly switch the aircraft from passenger to cargo configuration

However, Cessna has done more than just listen and talk. In 2013 it began deliveries of the Grand Caravan EX – a repowered version of the larger Caravan that originally entered service in 1990 – featuring a PT6A-140 engine, which delivers a 38% improvement in rate of climb, and is aimed at operators in hot and high environments. The EX will make up about 85% of production this year, says Tannahill, although Cessna has no plans to halt the 208, which still has an appeal among the owner-operator community, she says.

MAIN MISSION

Thirty-three years after launching the 208 programme, Cessna now produces four versions of the Caravan: the Grand Caravan EX in both conventional and amphibian configurations, as well as the standard 208 in standard and floatplane versions. Some 200 of the Grand Caravan EX have been delivered, around a fifth of which are amphibians. Cargo remains one of the main missions of the Caravan – FedEx was one of the launch operators and remains the biggest today, with a fleet of some 170 aircraft.

However, as the programme ages, the uses the Caravan is being put to “continue to expand”, insists Blackford, with commercial airline service being an important niche, particularly in the growing markets of Asia, where remote communities need to be connected to mainline services. “We are seeing EXs being flown on city pairs that previously have not had a service,” says Tannahill. The Caravan’s adaptability proves its worth, with operators regularly switching from primarily passenger to cargo configuration. “It’s an aircraft suited to changing gears,” she says.

With 75% of its production exported, South America, Asia and Africa are the biggest markets for the Caravan. China – as it is for many general aviation manufacturers – is crucial, with its crying need for everything from airline pilot training aircraft to commuter shuttles serving remote communities. In 2012, Cessna and China Aviation Industry General Aircraft (CAIGA) announced a joint venture to carry out final assembly of Grand Caravan EXs in China for the Chinese market.

The Shijiazhuang-based CAIGA venture has just gained approval to carry out maintenance,

“We are in talks with the engineers about increasing maximum take-off weight”

ADAM BLACKFORD

Business leader for the Caravan

but Tannahill says it will move to final assembly under its own production certificate within 18 months. “We will begin delivering the first kits in quarter four, and they will begin building them up next year. We are expecting audits between the FAA [Federal Aviation Administration] and the Chinese authorities in the latter part of 2015,” she says. Orders for amphibian Grand Caravan EXs in particular have been strong since the joint venture was established, with customers including Meiya Air for aerial sightseeing in Wuzhizhou island and Joy Air for charter tourism flights in Shanghai, Zhoushan and Shengsi islands.

Other changes for the passenger version of the Caravan include a new standard interior, with seats that are 5% lighter than their predecessors, a lightweight headliner and a lower sidewall. Around 20 aircraft fitted with the new cabin have been delivered so far. “It was welcome as we hadn’t had an interior upgrade for many years,” says Blackford.

Earlier this year, EASA approved a 14-seat configuration for the Grand Caravan EX, something that could spur other authorities to approve the variant. Tannahill says it will “allow many new uses for the aircraft in Europe”. Another possibility – although Blackford says it is simply something his engineering team have been asked to evaluate – is a weight increase. Maximum take-off weight is currently 3,995kg (8,807lb). “We have no specific targets, but we are in talks with the engineers about moving it higher,” he says.

Tannahill believes that, despite the new competition and the fact that the programme is entering its fourth decade, there is plenty life left in the Caravan. “We don’t see many limitations,” she says. “As long as customers want it, we will go on building it.” ■



The amphibious Grand Caravan EX is one of four versions of the aircraft that are now in production



The Beechcraft Baron B58 seats up to six people and has a maximum range of 1,480nm (2,740km)

Textron Aviation

PISTON POWER

Following its acquisition of Beechcraft last year, Textron's immediate focus appeared to be on jet aircraft. Now, though, attention is turning to the piston-engined families

STEPHEN TRIMBLE WICHITA

Since its founding less than 18 months ago, Textron Aviation has been quite busy. First, there was the critical task of blending two historically competitive organisations – Cessna and Beechcraft – into a unitary corporate system. Cessna also needed to concentrate on completing certification programmes of several upgraded and new aircraft in its Citation jet family.

For the pistons business, on the other hand, the focus through the transition appeared to be on maintaining the status quo. A 2012 teaser by the now-defunct Hawker Beechcraft showing four new aircraft concepts on the drawing boards, including three new small turboprops and one piston-powered aircraft, has received no promotion by the new management. A diesel-powered version of the Cessna 182 is now months behind schedule, with no public timetable for delivering the new aircraft.

Despite the slow pace of progress on product development, there are signs entering this year's EAA AirVenture fly-in in Oshkosh that the next and final step in the integration

of Textron Aviation's plan has already started, and it is now focusing on working out the pistons business.

In April, Textron Aviation appointed the first leader of the combined Cessna and Beech portfolio of piston-powered aircraft – Doug May. The former flight test pilot for Kohlman and Cessna is now responsible for five active production lines – namely, the Bonanza G36, Baron B58, 400 Corvallis TTX, 172S Skyhawk and 206H Turbo Stationair – that delivered 249 aircraft combined in 2014. The job also comes with several challenges to navigate, including a looming regulatory reform process, a dearth of new pilots limiting market

growth and several new competitors fighting to enter the IFR-certificated market segment.

Though well aware of the market dynamics in play, May is clearly happy to have the job.

"I think, from an OEM perspective, Textron Aviation is optimistic about what the future looks like," he says.

PASSIONATE ABOUT AVIATION

Noting that the piston segment is filled with "people who are passionate about aviation", May says that suits his background as well: "Ever since I could walk and talk and think, I wanted to be in aviation."

As May's appointment was announced in early April, Textron Aviation also moved to address one of the key issues facing the general aviation community: fewer new pilots entering the system to replace those who are leaving or retiring from flying.

The Aircraft Owners and Pilots Association (AOPA) has estimated that the number of registered pilots in the USA has declined by 25% since 1980, falling from 827,000 to about 610,000. That reduction occurred mainly in the first 15 years after 1980, however: as AOPA counted about 622,000 active pilots in 1996.



Cessna's diesel-fuelled Turbo Skylane JT-A

Textron Aviation

“Ever since I could walk and talk and think, I wanted to be in aviation”

DOUG MAY

Vice-president, piston aircraft, Textron Aviation

Although the number of pilots in the system may have stabilised over the past 20 years, the number of new single- and multi-engined aircraft deliveries to the general aviation market has continued a long nose-dive since peaking at 17,032 in 1978 to less than 700 a year today.

Shortly after May's appointment, Textron Aviation announced the launch of the “Top Hawk” programme. The company will provide access to a Cessna to each of four US universities with pilot training programmes: Embry-Riddle Aeronautical University, Kansas State University, Liberty University and the University of North Dakota. A student from each school also will work as an intern for Textron Aviation during the summer, teaching ground school classes while building flight hours. The four interns will then compete for a Top Hawk award given to the best pilot in the group.

At the same time, May is realistic that such programmes alone are not a sufficient answer to fundamental dynamics driving the declining number of pilots and new aircraft deliveries.

“The industry as a whole is going to have to address that going forward,” May says. “There's obviously demand and that demand is not going to go away.”

What is going away is the regulatory regime that has governed aircraft design and manufacturing for the general aviation community for decades. The US Federal Aviation Administration plans to release a notice of proposed rulemaking to rewrite Part 23 of the federal



The six-seater Beechcraft Bonanza G36 is designed for the rugged utility category

aviation regulations, covering all aircraft weighing up to 8,620kg (19,000lb) and carrying up to 19 passengers.

PRESCRIPTIVE REGULATIONS

Part 23 currently applies regulations on piston-powered aircraft in the same prescriptive manner used for much larger and more expensive transport-category aircraft. For decades, this method seemed acceptable, because technology available to the general aviation community was relatively simple and straightforward to certificate. As computer processing power has miniaturised, however, the cost of following the FAA's highly prescriptive certification rules has slowed or blocked some innovations from migrating to the general aviation community, as well as reduced the introduction of new designs to a trickle.

By adopting performance-based rules with the forthcoming Part 23 rewrite, the FAA has promised to “double safety at half the cost”. Whether the rewrite lives up to its slogan is still too early to tell. The FAA has not yet released any details, besides pledging to release the proposed rulemaking by the end of this year. A final rule is not expected to take effect

until 2017, which is two years after a “deadline” set by Congress in 2012.

The timing of the rulemaking does not appear to be having a direct effect on Textron Aviation's product development plans for the general aviation sector.

“I think the thing I would offer is that, more than most, Textron Aviation is well-positioned to leverage [the Part 23 rewrite] because we've already got a process in place,”

“The number of registered pilots in the USA has declined by 25% since 1980, from 827,000 to about 610,000”

says May, noting a track record of having introduced 35 new or upgraded products over the past decade.

“I think one of the things that Textron Aviation is always doing is evaluating where we're at and where we want to go and where we're investing,” he says. “It's a process that has gone on for 80-plus years. We'll continue to look at how to meet our customers' needs.”

One of those needs is a diesel engine. The standard avgas relied upon by general aviation for generations is in short supply in many places in the world, especially Europe and Africa. It is also becoming increasingly expensive, justifying a broad transition to diesel fuel.

Cessna has already received certification by the European Aviation Safety Agency for a diesel-powered version of the 172 Skyhawk. But the company has been slower to complete certification of a diesel-powered 182 Skylane, dubbed the JT-A. Though originally scheduled to be certificated in late 2013, Textron Aviation now declines to provide a timetable to reach that milestone. But the company remains committed to the programme, May says.

“We've got a team actively working towards certification on 182,” May says. “Textron Aviation is committed to taking as long as it might be to take that technology to our product line.” ■



There is no timetable for certification of the Skylane JT-A, originally scheduled for 2013

FLIGHT INTERNATIONAL

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Don't discount Inmarsat track

Fire on board an aircraft is perhaps the airman's worst nightmare. Whilst sharing reticence in speculating on the fate of [Malaysia Airlines flight] MH370 it seems to me that Messrs Straker & Lloyd (*Flight International*, 30 June-6 July) are missing a very important point.

In themselves and out of the MH370 context their comments are totally credible – however, presumably reliable information from Inmarsat indicates that the aircraft continued to fly on for about 6h.

Would a fire – one assumes of increasing intensity, sufficient to disable or severely disrupt aircraft systems – have left MH370 able to fly for this long?

The nearest parallel to their hypothesis that I can call to mind is the onboard fire on the New York to Geneva Swissair flight [111, in 1988], which only survived for about 15min after fire was declared.

Five or six hours? To put it mildly, improbable.

Richard Chandless

Crèches-sur-Saône, France

OPERATIONS

TransAsia's red light for safety

With the publication of the accident report into the tragic loss of TransAsia Airways flight GE235 (*Flight International*, 7-13 July), a couple of points have to be underlined.

It is imperative that pilots understand the inseparable aerodynamic link between rolling and yawing. This has to be drilled into each and every person aspiring to be a pilot.

Amazing video showed the last few seconds before the crash, where the aircraft clearly yaws into the ground as a direct result of the left rolling moment.

This is not the first time a pilot shut down the wrong engine in a crucial moment – and I am sad to say that it will not be the last time either. This calls for radical new ideas to be introduced into the cockpit for engine controls.

One would be to separate the engine controls at the top of the lever much more than today. Another would be to install a LED to the top of the levers. This would be embedded and remain neutral during normal operations, but in the case of something going wrong with the engine(s) this bright red colour could provide the vital visual information to the pilot at the absolutely critical time.

We need to look at these ideas seriously in order to ensure that the pilot always makes the correct decision at these crucial moments and saves lives.

E L Mertsoy

Izmir, Turkey



Re: Features

Action needed after tragic loss

Fuel-hardy idea?

With regard to Matt Wood's proposal for commercial aircraft in-flight refueling (*Flight International*, 30 June-6 July), I have several concerns.

It is doubtful that any airline and pilot union would permit extreme close proximity to another aircraft; the traffic collision avoidance system would have to be turned off, and expensive type-design fuel plumbing, avionics, and eyebrow window modifications would be needed, not to mention simulator changes and pilot training.

Lower altitude and speed reduction for in-flight fuel connec-

tion is necessary, and the weather would need to be perfect.

Turbulence and low visibility would cause aborted refuelling and a diversion to an appropriate airfield for lack of fuel. The diversion would upset passengers who were promised a non-stop flight.

And, after watching a YouTube video about an E-3 AWACS air refueling gone wrong, this "self-loading freight" would like a four-point harness, a large single malt and a rosary during such a hook-up.

It's a fun idea, but let's leave it to the military... please.

Chris Barnes

South Carolina, USA

Honest account

In his letter headed "What's Boeing on with accounting?" (*Flight International*, 30 June-6 July), J McDermott makes three points [about the 787]. One, Boeing is carrying forward enormous losses; two, it is overstating its profits; and three, its legal compliance with accounting laws.

In fact Boeing is not carrying forward enormous losses: it is carrying forward as-yet unrecovered development costs. Your correspondent is confusing losses with costs.

Any company developing an expensive product will incur development costs, which it will plan to recover from subsequent sales – and the 787 programme is certainly expensive.

The recovery of development costs is a function of the forecast total costs divided by the anticipated unit sales. Both of these forecasts are the responsibility of Boeing's directors, and their assumptions are checked as "reasonable" by the company's auditors. Thus, if the forecasts prove to be correct, Boeing is not at present overstating its profits.

The above procedure is in accordance with standard accounting practice. Indeed, there is no alternative to this procedure.

Peter Martin

Hindhead, Surrey, UK

Tanks for that

Afraid tank recognition is not your strong point (Straight & Level, *Flight International*, 7-13 July). It's a Panzer IV, which was much less potent an adversary than the Panther (Panzer V).

Roger Caesley

via email

Editor's reply: Apologies for our mistake. We'll try to stick to "things with wings" in the future.



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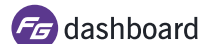
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EVENTS

6-7 August

Baltic Business Aviation Forum
Jurmala, Latvia
bbaf.aero/en/

25-30 August

MAKS
Moscow, Russia
aviasalon.com



15-16 September

Flight Safety Symposium
London, UK
flightglobalevents.com/
flightsafety Symposium 2015

15-18 September

DSEI 2015
ExCel, London, UK
dsei.co.uk



29-30 September

Aviation Partnership Summit
Amsterdam, The Netherlands
flightglobalevents.com/APS15



29-30 September

**New Generation of Airline
Passenger Systems**
London, UK
flightglobalevents.com/pss2015

1 October

US Corporate Aviation Summit
Fort Lauderdale, Florida
aeropodium.com/uscas

1-2 October

Central Asian Aviation Symposium
Almaty, Kazakhstan
aeropodium.com/caa

6-8 October

Helitech International
ExCel, London, UK
helitechevents.com

20-21 October

The Commercial UAV Show
ExCel, London, UK
terrapinn.com/exhibition/
the-commercial-uav-show

8-12 November

Dubai Airshow
Dubai World Central
dubaiairshow.aero

15-17 November

ALTA Airline Leaders Forum
San Juan, Puerto Rico
alta.aero/airlineleaders/2015

17-19 November

NBAA 2015
Las Vegas, USA
nbaa.org/events/bace/2015

17-19 November

Aerospace & Defense Meetings Torino
Torino, Italy
bciaerospace.com/turin

19-20 November

Safety In African Aviation
Kigali, Rwanda
2gether4safety.org

1-2 December

**Military Airlift and Rapid Reaction
Operations**
Seville, Spain
smi-online.co.uk/defence/europe

8-10 December

Aerospace Meetings Brazil
São Paulo, Brazil
bciaerospace.com/brazil



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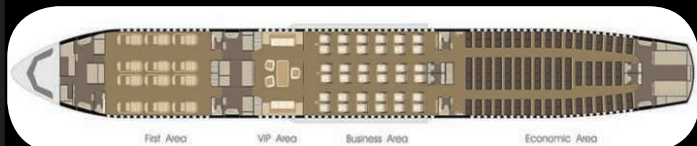
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ENGINES

Type: CFM 56-5C4 Manufacturer: CFMI
Engine #1 741727 Cycles remaining 4,570
Engine #2 741809 Cycles remaining 2,294
Engine #3 741811 Cycles remaining 4,161
Engine #4 741728 Cycles remaining 3,903

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Tenders



Ref: DACAW/Delivery Financing/737-800/Senior/2015/253

Date: 16 June 2015

NOTICE: Request for Proposal (RFP) Senior Loan for Delivery Financing of 2(two) Boeing 737-800 aircraft

Biman Bangladesh Airlines Ltd. (Biman) has entered into an agreement with the Boeing Company ("Boeing") for the purchase of 2 (two) Boeing 737-800 aircraft ("the Aircraft") which are scheduled to be delivered on November 2015 and December 2015. Biman seeks offer from reputed financial institutions for Delivery Financing for the Aircraft in either of the following form:

(a) Invitation – Senior Commercial Loan ("the Senior Loan") Financing

The financing shall be in US Dollars for a 12 years term for up to USD 89.20 Million. The loan will be supported by a guarantee from the Government of Bangladesh. The form and structure of the loan and the guarantee will be as agreed with Biman and the Government of Bangladesh; or

(b) Invitation – Ex-Im Bank Guaranteed Loan Financing

Biman has submitted application to the U.S. Export-Import Bank ("Ex-Im Bank") for Guarantee support and Biman expects to receive the Final Commitment from the Ex-Im Bank by middle of July 2015. Basic requirements under this financing are mentioned below:

Purpose of Financing	Term loan to finance the senior portion of the net delivery price of aircraft plus 100% of Ex-Im Bank Exposure Fee.
Estimated Amount of Financing	Aggregate amount of Ex-Im Bank guaranteed financing including the exposure fee will be up to USD 89.20 Million.
Term of Guaranteed Loan	12 years from respective aircraft delivery dates.
Currency of Financing	US Dollars.

2. Offer may be made only for the Senior Loan referred under this RFP, or jointly for the Senior Loan and the Commercial Loan referred under a separate RFP ref: DACAW/Delivery Financing/737-800/ Commercial/2015/254 Date:16 June 2015.

3. Detailed information is available in the RFP Schedule, which may be viewed at Biman's website: www.biman-airlines.com. For further information or query, Controller of Accounts, Biman Bangladesh Airlines Ltd, may be contacted at Telephone: +8802-890-1590, Cell: +88-011-9042-0627, e-mail: controller@bdbiman.com during the office hours.

4. The Proposal / Offer should be submitted at the latest by 1000 hours BST (0400 hours UTC) on 30 July 2015 addressed to Controller of Accounts, Biman Bangladesh Airlines Ltd., Head Office, Balaka, Dhaka, Bangladesh through Courier Service or E-mail at finance-737-800-sl@bdbiman.com. The proposal(s)/offer(s) will be opened on the same day immediately after the closing time. No proposal/offer would be accepted after the closing time on the date specified above. Biman Bangladesh Airlines Ltd. would not be responsible for late receipt of any proposal/offer due to any reason whatsoever.

5. Biman Bangladesh Airlines Ltd. reserves the right to accept or reject any or all proposal(s)/offer(s) partly or wholly at any time and/or stage without assigning any reason whatsoever and no claim shall be entertained in this regard.

Controller of Accounts



Ref: DACAW/Delivery Financing/737-800/Commercial/2015/254

Date: 06 June 2015

NOTICE: Request for Proposal (RFP) Commercial Loan for Delivery Financing of 2 (two) Boeing 737-800 aircraft

Biman Bangladesh Airlines (Biman) entered into an agreement with The Boeing Company ("Boeing") for the purchase of 2 (two) 737-800 aircraft ("the Aircraft") which are scheduled to be delivered in November 2015 and December 2015. Biman has already made the advance payments (i.e. Pre-Delivery Payment) required under the Boeing Purchase Agreement for the Aircraft. Delivery financing for Senior Loan of the Aircraft net price, on which first charge will be created, will be arranged as provided under the separate RFP (Ref: DACAW/Delivery Financing/737-800/Senior/2015/253 Date: 16 June 2015) titled as "Request for Proposal (RFP) Senior Loan for Delivery Financing of 2(two) Boeing 737-800 aircraft". The remaining amount of the net aircraft price will be financed either in the form of a subordinated loan with a second charge or purely commercial loan. Such a loan will be supported by a guarantee to be provided by the Government of Bangladesh.

2.Offer may be made only for the commercial loan referred under this RFP, or jointly for the commercial loan and the senior loan referred under a separate RFP: DACAW/Delivery Financing/737-800/Senior/2015/253 Date: 16 June 2015 titled as "Request for Proposal (RFP) Senior Loan for Delivery Financing of 2(two) Boeing 737-800 aircraft".

3. Basic requirements are mentioned below:

Purpose of Financing	Term loan to finance part of the net aircraft delivery price.
Estimated Amount of Financing	Aggregate amount of financing will be a maximum of USD 20.45 Million.
Term of Guaranteed Loan	Up to 12 years from respective aircraft delivery dates.
Currency of Financing	US Dollars

4.Detailed information is available in the RFP Schedule, which may be viewed at Biman's website: www.biman-airlines.com. For further information or query, Controller of Accounts, Biman Bangladesh Airlines Ltd, may be contacted at Telephone: +8802-890-1590, Cell: +88-011-9042-0627, e-mail: controller@bdbiman.com during the office hours.

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WORK EXPERIENCE STEPHEN BISLAND

Team ethos drives Glasgow growth

Stephen Bisland, Emirates' airport services manager at Glasgow airport, takes pride in the role he plays to support growth at the airline and is looking forward to new challenges with the company over the next five years

What are your qualifications?

I left school with few formal qualifications. I worked my way up the career ladder to my current position as Emirates' airport services manager at Glasgow. In my job you learn from experience, but Emirates employees are offered a range of internal and external courses at the airline's training centre in Dubai. Courses on security, international regulations, and health and safety are compulsory for airport staff. I've also taken part in training courses on softer skills such as how to manage staff.

How did your career in the aviation industry begin?

With no prior experience in the aviation industry I landed a check-in agent job for Ogden Aviation at Glasgow airport in 1992, working with Air 2000. Later that year Ogden lost its Air 2000 contract to Servisair, which became my new employer. There I worked closely with airlines in flight dispatch and was delighted when I secured a role with AirUK as a check-in agent – my most important career break. From there I moved up the ranks with a number of airlines until I landed my first job with Emirates in 2004.

Tell us about your current role. I'm responsible for overseeing every aspect of Emirates' operations in Glasgow, where we have a team of 20 full-time staff servicing two daily flights to Dubai. As well as managing my own team, I work closely with Glasgow air-



Bisland took a check-in agent job in 1992 – and has never looked back

port and Emirates' service partners to ensure our passengers are safe, secure and comfortable. Importantly, I'm responsible for managing Emirates' station budget and making sure we hit our cost and sales targets. Another big part of my role is emergency planning.

What is your typical day like?

My first tasks in the morning are to confirm the estimated arrival time of our first flight from Dubai – the EK27 – and to report into Emirates' headquarters in Dubai. My day also involves meetings with my team and with airport partners. I also like to rotate operational inspections, from monitoring an aircraft turnaround to checking Emirates' chauffeur service cars. There are also some "glamorous" tasks. In May we hosted professional rugby players at the Emirates Lounge as part

"There are some great personalities here at Glasgow, which has to be one of the friendliest airports in the world"

of our sponsorship of the Scottish Rugby 7s.

What are the most challenging aspects of your job?

Scotland's unpredictable weather, especially in winter, can make aircraft turnaround more challenging than in other parts of the world. I sometimes have to make difficult operational decisions quickly, but it does get easier with experience. It's also important to keep my team calm and positive during busy periods

such as the 2014 Commonwealth Games. I can only be grateful for having such a dedicated group of people working with me.

What do you enjoy most about your role?

I love the variety – no two days are ever the same. There are also some great personalities here at Glasgow airport, which has to be one of the friendliest airports in the world. I've worked here for 23 years so it feels like home. Emirates is one of the largest carriers here, so many people are involved in the turnaround of our aircraft. People in Glasgow, both at the airport and in the city, are really interested in what we're doing and I enjoy the part I play in that.

Where do you see yourself in five years' time?

2014 was Emirates' busiest-ever year at Glasgow airport, with the increase in international visitors to the city and the launch of the Emirates Lounge. Because operations in Glasgow are so strong, there will be many new projects to get involved in. In five years' time I hope to have helped Emirates achieve plenty more milestones in Glasgow. ■



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